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# Two-Sample Two-Stage Least Squares (TSTSLS) estimates of earnings mobility: how consistent are they?

**John Jerrim[1], Alvaro Choi[2] and Rosa Simancas Rodriguez[3]**

**Abstract**

Academics and policymakers have shown great interest in cross-national comparisons of intergenerational earnings mobility. However, producing consistent and comparable estimates of earnings mobility is not a trivial task. In most countries researchers are unable to observe earnings information for two generations. They are thus forced to rely upon imputed data instead. This paper builds upon previous work by considering the consistency of the intergenerational correlation (ρ) as well as the elasticity (β), how this changes when using a range of different instrumental (imputer) variables, and highlighting an important but infrequently discussed measurement issue. Our key finding is that, while TSTSLS estimates of β and ρ are both likely to be inconsistent, the magnitude of this problem is much greater for the former than it is for the latter. We conclude by offering advice on estimating earnings mobility using this methodology.

**JEL codes:** I20, I21, I28

**Keywords:** Earnings mobility, two sample two stage least squares

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## 1. Introduction

Over the last twenty years, academics and policymakers have shown great interest in intergenerational mobility – the strength of the association between individuals' social origin and social destination. Economists have added much to this debate, particularly through their examinations of the link between the earnings (or incomes) of fathers and sons. However, due to data limitations, obtaining consistent estimates of earnings mobility remains a non-trivial task (Solon 1992; Black and Devereux 2011; Blanden 2013). The contribution of this paper is to present new evidence on the consistency of Two-Sample Two-Stage Least Squares (TSTSLS) estimates of earnings mobility; a methodology now widely applied in this literature (Appendix A reviews almost 30 papers where it has been used). Indeed, TSTSLS has proven to be the only way to estimate earnings mobility in a number of countries, including Australia, France, Italy, Spain, Switzerland, Japan, China and South Africa. Figure 1 illustrates the particularly prominent role it has therefore played in cross-national comparisons of earnings mobility; of the 20 countries included in Corak (2012), TSTSLS has been used in more than half (those with white bars).

**<< Figure 1 >>**

Yet, despite the important work of Björklund and Jäntti (1997) and Nicoletti and Ermisch (2008), more needs to be known about the consistency of TSTSLS estimates of earnings mobility. We therefore build upon the aforementioned authors' work by extending their framework from the intergenerational elasticity (β) to the intergenerational correlation (ρ), quantifying the inconsistency of TSTSLS estimates when using a range of different instrumental (imputer) variables, and considering a potentially important (yet little discussed) measurement issue.

The TSTSLS estimation procedure can be summarised as follows. Ideally, earnings mobility would be estimated via the following Ordinary Least Squares (OLS) regression model:

$$Y_{True} = \alpha + \beta . X_{True} + u \quad (1)$$

Where:

$Y_{True}$ = (Log) permanent earnings of sons

$X_{True}$ = (Log) permanent earnings of fathers

Two different measures of earnings mobility would then typically be produced: the intergenerational earnings elasticity ($\beta_{OLS}$):

$$\beta_{OLS} = \frac{\sigma_{X,Y}}{\sigma_X{}^2} \quad (2)$$

Where:

$\sigma_{X,Y}$ = The covariance between father's and son's permanent earnings

$\sigma_X{}^2$= The variance of father's earnings

and the intergenerational correlation ($\rho_{OLS}$):

$$\rho_{OLS} = \frac{\sigma_{X,Y}}{\sigma_X{}^2} . \frac{\sigma_X}{\sigma_Y} = \frac{\sigma_{X,Y}}{\sigma_X . \sigma_Y} \quad (3)$$

Where:

$\sigma_X$= The standard deviation of father's earnings

$\sigma_Y$= The standard deviation of son's earnings

The measure of $X_{True}$ preferred in the literature is a time-average of father's annual earnings across several years ($X_{AVG}$)[4]. However, in many countries, earnings data cannot be linked across generations – i.e. there is no dataset where both father's and son's earnings can be observed. The TSTSLS approach attempts to overcome this problem via imputation – predictions of father's earnings are made based upon other observable characteristics (e.g. their occupation and education level). Equation 1 is then estimated using these predictions of father's earnings ($\hat{X}$) instead of a measure that has been directly observed (e.g. $X_{AVG}$). This is often described as an instrumental variable technique in the earnings mobility literature (e.g. Lefranc and Trannoy 2005; Nuñez and Miranda 2011), though it can alternatively be viewed as a cold-deck imputation procedure (Nicoletti and Ermisch 2008) or a 'generated regressor' approach (Murphy and Topel 1985; Wooldridge 2002:115; Inoue and Solon 2010).

[4] Although five consecutive years of father's earnings is often used (Solon 1992; Vogel 2008; Björklund and Chadwick 2003; Hussein et al 2008; Corak and Heisz 1999), more than ten may be needed if there is substantial auto-correlation in the transitory component of earnings over time (Björklund and Jäntti 2009; Mazumder 2005).

Solon (1992), Björklund and Jäntti (1997) and Nicoletti and Ermisch (2008) consider the properties of TSTSLS estimates of the intergenerational elasticity ($\beta_{TSTSLS}$). They show that consistent estimates can be obtained if either:

- The instrumental (imputer) variables have no direct effect upon son's earnings
- The $R^2$ of the equation used to predict father's earnings equals one

Yet, as father's education and occupation are the instruments (imputer variables) usually available, it is widely recognised that neither of these conditions hold. (Father's education and social class are likely to independently influence offspring's earnings, while also not being perfect predictors of father's permanent earnings). It is thus often stated that $\beta_{TSTSLS}$ will be upward inconsistent as a result[5].

The key issue thus becomes the *magnitude* of this upward inconsistency. It is small enough to be safely ignored, or is it so large that TSTSLS estimates of earnings mobility become problematic? Likewise, if more detail is added to the model predicting father's earnings, does this significantly reduce the upward inconsistency? Unfortunately, little is currently known about these important issues. Indeed, the only study to quantify the inconsistency of $\beta_{TSTSLS}$ is Björklund and Jäntti (1997). For one particular imputation model, containing a specific set of predictor variables, they find upward inconsistency of around 30 percent.

We contribute to this evidence base in multiple ways. First, the framework of Björklund and Jäntti (1997) and Nicoletti and Ermisch (2008) is extended from the intergenerational elasticity to the intergenerational correlation ($\rho_{TSTSLS}$). We use this to explain why $\rho_{TSTSLS}$ is *downward* inconsistent in our empirical analysis (i.e. in the opposite direction of the inconsistency of $\beta_{TSTSLS}$). Second, new evidence is provided on the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ using a range of different imputer variables, and thus the extent to which this problem can be reduced through use of a more detailed first-stage prediction model. Third, we divide $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ into components to demonstrate what is driving their inconsistency, and show how this changes when different prediction models are specified. It is also hoped that this will resolve some confusion in the applied literature, where it is often stated that the goal is to 'choose the instruments in order for the $R^2$ of the

[5] The following section will present a framework which illustrates why this is the case.

[father's earnings prediction] regression to be as high as possible' (Cervini-Pla 2012:9)[6]. Finally, we note how most studies make predictions of father's current earnings ($X_{single}$), whereas permanent earnings ($X_{True}$) is the actual unobserved variable of interest. We argue that, in this situation, more general expressions for the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ are needed. Our empirical analysis then illustrates how conventional wisdom (e.g. $\beta_{TSTSLS}$ always being upward inconsistent) no longer holds.

The paper now proceeds as follows. Properties of TSTSLS earnings mobility estimates are reviewed in section 2. This is followed by an overview of the Panel Survey of Income Dynamics (PSID) dataset and our empirical methodology in section 3. Results are presented in section 4, and conclusions in section 5.

## 2. TSTSLS estimates of earnings mobility

Our starting point is the framework of Nicoletti and Ermisch (2008). As noted in the introduction, the model of interest is:

$$Y_{True} = \beta . X_{True} + \mu \quad (4)$$

Where:

$Y_{True}$ = Log son's permanent earnings

$X_{True}$ = Log father's permanent earnings

$X_{True}$ is unobserved in the 'main' dataset, but it does contain additional characteristics (Z), such as father's education and occupation, likely to be associated with $X_{True}$.

Now say a second 'auxiliary' sample (i) contains a measure of respondents' permanent earnings[7] (ii) is drawn from the same population and (iii) contains the same Z variables. The following OLS regression model can be estimated:

$$X_{True} = \delta . Z + v \quad (5)$$

Where:

[6] In our empirical analysis we show that adding variables to increase the first-stage $R^2$ can actually increase the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$.

[7] Time-average earnings would be the preferred measure within the auxiliary dataset. Unfortunately, this is rarely available, and so current earnings are often used as the 'first-stage' dependent variable instead. We illustrate how this influences TSTSLS estimates in section 4.

Z = The instrumental (imputer) variables

And then used to predict log permanent father's earnings:

$$\hat{X} = \hat{\delta}.Z \quad (6)$$

Where:

$\hat{X}$ = Predicted log father's permanent earnings

$\hat{\delta}$= Estimated regression coefficients from the first-stage prediction model

Hence (7) can now be estimated rather than (1):

$$Y_{True} = \beta.\hat{X} + u \quad (7)$$

Estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ then follow from equations 2 and 3 (substituting $\hat{X}$ for $X$).

The two most commonly used Z variables are father's education and occupation (see Appendix A). However, both are likely to directly influence son's earnings (i.e. they are likely to be endogenous)[8]. Consequently, son's log earnings will actually be given by:

$$Y_{True} = \lambda_1.X_{True} + \lambda_2.\hat{X} + u \quad (8)$$

With $\lambda_1$ being the direct impact of the father's *actual* permanent earnings on son's earnings and $\lambda_2$ the effect of father's *predicted* earnings on son's earnings. (From this point forward, we drop the 'True' subscript for notational convenience). Solon (1992) and Björklund and Jäntti (1997) show that $\beta_{TSTSLS}$ thus converges in probability to:

$$plim\ \beta_{TSTSLS} = \lambda_1 + \lambda_2.\frac{\sigma_{\hat{X}}}{\eta.\sigma_X}$$

$$= \beta + \lambda_2.\sigma_{\hat{X}}.\frac{(1-\eta^2)}{\eta.\sigma_X} \quad (9)$$

Where:

$\sigma_{\hat{X}}$ = The standard deviation of father's *predicted* earnings

[8] One way to think about this is that father's education and social class influences their children's labour market outcomes, over and above the impact the greater earnings that highly educated, professional father's generate.

$\sigma_X$= The standard deviation of father's *actual* long-run earnings

With:

$$\eta = \frac{\sigma_{\hat{X},X}}{\sigma_{\hat{X}}.\sigma_X}$$

Where:

$\sigma_{\hat{X},X}$= The covariance between predicted and actual log father's earnings

Under the assumption that the covariance between predicted and actual log father's earnings is equal to the covariance between predicted father's earnings and itself:

$$\sigma_{\hat{X},X} = \sigma_{\hat{X},\hat{X}} \tag{10}$$

$\eta$ becomes[9]:

$$\eta = \frac{\sigma_{\hat{X},X}}{\sigma_{\hat{X}}.\sigma_X} = \frac{\sigma_{\hat{X},\hat{X}}}{\sigma_{\hat{X}}.\sigma_X} = \frac{{\sigma_{\hat{X}}}^2}{\sigma_{\hat{X}}.\sigma_X} = \frac{\sigma_{\hat{X}}}{\sigma_X} = R \tag{11}$$

Where:

R = The square root of the variance explained ($R^2$) in the first-stage prediction model (i.e. of equation 5).

The probability limit of $\beta_{TSTSLS}$ then becomes:

$$= \beta + \lambda_2.\sigma_{\hat{X}}.\frac{(1-\frac{{\sigma_{\hat{X}}}^2}{{\sigma_X}^2})}{\frac{\sigma_{\hat{X}}}{\sigma_X}.\sigma_X}$$

$$= \beta + \lambda_2.\sigma_{\hat{X}}.\frac{(1-\frac{{\sigma_{\hat{X}}}^2}{{\sigma_X}^2})}{\sigma_{\hat{X}}.}$$

$$= \beta + \lambda_2.(1-\frac{{\sigma_{\hat{X}}}^2}{{\sigma_X}^2})$$

$$= \beta + \lambda_2.(1-R^2) \tag{12}$$

[9] The covariance between a variable and itself is equal to the variance of that variable. Hence $\sigma_{\hat{X},\hat{X}}$becomes ${\sigma_{\hat{X}}}^2$.

With the inconsistency of $\beta_{TSTSLS}$ therefore:

$$\lambda_2.(1 - R^2) \tag{13}$$

There are a number of important points to note about (11), (12) and (13). First, as $0 \leq R^2 \leq 1$, the variance of father's predicted earnings must be less than or equal to the variance of actual father's earnings:

$$0 < {\sigma_{\hat{X}}}^2 \leq {\sigma_X}^2$$

Second, if the variance of father's predicted earnings (${\sigma_{\hat{X}}}^2$) were equal to the variance of father's actual earnings (${\sigma_X}^2$), then $R^2=1$ and the inconsistency of $\beta_{TSTSLS}$ reduces to zero. Hence, in this framework, the inconsistency of $\beta_{TSTSLS}$ is driven by incorrect estimation of the variability in father's predicted earnings. Third, if the Z variables are indeed exogenous with respect to son's earnings, then $\lambda_2$ equals 0, and $\beta_{TSTSLS}$ is consistent. However, if parental education and occupation are the Z chosen, $\lambda_2$ will almost certainly be positive ($\lambda_2>0$)[10]. Thus, under the reasonable assumption that $\lambda_2>0$, and given $R^2 \leq 1$, $\beta_{TSTSLS}$ will be upwardly inconsistent. Fourth, if everything else remains unchanged, the magnitude of this upward inconsistency will decrease as the variance explained in the first-stage prediction equation increases. Or, to put this another way, the upward inconsistency will decrease as the variance of father's predicted earnings tends towards the variance of father's actual earnings (${\sigma_{\hat{X}}}^2 \rightarrow {\sigma_X}^2$). Fifth, it is important to recognise, however, that including additional variables to increase the $R^2$ of the first-stage prediction equation may simultaneously influence $\lambda_2$. Consequently, adding a particularly endogenous Z variable could increase $\lambda_2$ to such an extent that it more than offsets the benefits of any change to the first-stage $R^2$. Whether adding variables to the prediction equation reduces the inconsistency of $\beta_{TSTSLS}$ is therefore an (underexplored) empirical issue, representing a gap in the literature that this paper attempts to fill.

Next, we extend the framework of Björklund and Jäntti (1997) and Nicoletti and Ermisch (2008) to the intergenerational correlation ($\rho_{TSTSLS}$). If one could observe $X_{True}$ and $Y_{True}$, ρ would simply be:

[10] In other words, offspring with more educated parents from higher social classes are likely to earn more than offspring from less advantaged backgrounds, even after father's actual long-run earnings have been taken into account.

$$\rho = \beta.\frac{\sigma_X}{\sigma_Y} \tag{14}$$

Replacing $\sigma_X$ with $\sigma_{\hat{X}}$, and β with $\beta_{TSTSLS}$, $\rho_{TSTSLS}$ converges in probability to:

$$Plim\ \rho_{TSTSLS} = \beta_{TSTSLS}.\frac{\sigma_{\hat{X}}}{\sigma_Y}$$

$$= [\beta + \lambda_2.(1 - R^2)].\frac{\sigma_{\hat{X}}}{\sigma_Y}$$

$$= \left[\beta.\frac{\sigma_{\hat{X}}}{\sigma_Y} + \lambda_2.\frac{\sigma_{\hat{X}}}{\sigma_Y}.(1 - R^2)\right] \tag{15}$$

The inconsistency of $\rho_{TSTSLS}$ is then given by (15) – (14):

$$\left[\beta.\frac{\sigma_{\hat{X}}}{\sigma_Y} + \lambda_2.\frac{\sigma_{\hat{X}}}{\sigma_Y}.(1 - R^2)\right] - \beta.\frac{\sigma_X}{\sigma_Y}$$

$$= \beta.\left[\frac{\sigma_{\hat{X}}}{\sigma_Y} - \frac{\sigma_X}{\sigma_Y}\right] + \lambda_2.\frac{\sigma_{\hat{X}}}{\sigma_Y}.(1 - R^2) \tag{16}$$

Now define A as the left-hand side of (16) and B as the right-hand side:

$$A = \beta.\left[\frac{\sigma_{\hat{X}}}{\sigma_Y} - \frac{\sigma_X}{\sigma_Y}\right] \tag{17}$$

$$B = \lambda_2.\frac{\sigma_{\hat{X}}}{\sigma_Y}.(1 - R^2) \tag{18}$$

Under the previously stated assumption that $\sigma_{\hat{X}}^2 \leq \sigma_X^2$, then A ≤ 0 (i.e. this will lead to *downward* inconsistency in $\rho_{TSTSLS}$). In contrast, assuming that $\lambda_2$>0 then, as $R^2 \leq 1$, B ≥ 0 (i.e. this will lead to *upward* inconsistency in $\rho_{TSTSLS}$). Therefore, unlike $\beta_{TSTSLS}$, one does not know the direction of the inconsistency in $\rho_{TSTSLS}$. Rather, it depends upon the relative magnitudes of A and B. This is again an empirical issue, which we provide the first evidence upon in our analysis.

The derivations presented above have all relied upon the following assumptions:

- The main and auxiliary datasets are random samples from the same population
- The Z variables are independent and identically distributed across the two datasets
- That $X_{True}$ is the first-stage dependent variable, and it is this quantity that we wish to impute into the main dataset.

To meet these assumptions, it would be ideal for the main and auxiliary datasets to be identical (with the exception, of course, that the former does not include $X_{True}$). In this situation, the consistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ is driven solely by the choice of imputer variables (Z) as set out above.

In reality, these assumptions may not be met. For instance, Björklund and Jäntti (1997) note it is common for respondents to report their own education and occupation (Z) in the auxiliary dataset, but for offspring's proxy reports of their father's characteristics to be available in the main dataset. The impact this has upon the consistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ will depend upon the nature and extent of this measurement error. We therefore also consider this issue in our empirical analysis.

Moreover, there is the additional complication of how father's earnings are measured in the auxiliary dataset. Returning to equation (5), it has thus far been implicitly assumed that $X_{True}$ (permanent father's earnings) is available within the auxiliary dataset. Yet, in practise, this is almost never the case. Rather, researchers typically have access to data for a cross-section of adults whose earnings are recorded for one particular year ($X_{SINGLE}$). A common choice is a labour force survey, for example. Therefore the prediction model is often specified as (19) rather than (5):

$$X_{SINGLE} = \delta.Z + \gamma.A + v \tag{19}$$

where:

$X_{SINGLE}$ = Earnings in a single year for a cross-section of adults

$Z$ = The imputation variables

A = Age group dummy variables

Estimates from (19) are then used to generate predictions of father's earnings in the main dataset instead of equation (6), with age set to around 40 (as the approximate point when annual earnings reach their peak):

$$\hat{X}_{single} = \hat{\delta}.Z + \hat{\gamma}.Age40 \tag{20}$$

Yet little is known about the consistency of TSTSLS estimates in such situations, where the first-stage dependent variable ($X_{Single}$) differs from the unobserved construct of interest

($X_{True}$). Indeed, this issue was not explicitly considered by Björklund and Jäntti (1997) or Nicoletti and Ermisch (2008), and should not be assumed to be an innocuous change to the framework presented above.

We illustrate this point with an example. First, suppose that $X_{true}$ is contained within the auxiliary dataset, along with a sufficiently rich set of Z so that the first-stage $R^2$ equals one. Consequently, $\hat{X}$ will be identical to $X_{True}$, thus resulting in consistent estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ (e.g. recall equation 13). Now consider the same scenario, but where $X_{Single}$ is the first-stage dependent variable. A first-stage $R^2$ of one would imply that $\hat{X} = X_{single}$, resulting in rather different estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ (i.e. it is well established in the literature that $X_{Single} \neq X_{True}$). Specifically, the use of $X_{Single}$ would lead to *downwardly* inconsistent estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$. This highlights how the corollaries presented within the framework above (e.g. $\beta_{TSTSLS}$ always being upward inconsistent) do not necessarily hold when the first-stage variable being imputed ($X_{Single}$) differs from the construct actually of interest ($X_{True}$).

More general expressions for the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ are therefore required, which hold whether either $X_{single}$ or $X_{true}$ are used as the first-stage dependent variable. First, consistent estimates of $\beta_{OLS}$ from equation (1) converge in probability to:

$$Plim\ \beta = \frac{\sigma_{X,Y}}{{\sigma_X}^2} \tag{21}$$

Under TSTSLS, as X is unavailable, $\hat{X}$ enters in its place:

$$Plim\ \beta_{TSTSLS} = \frac{\sigma_{\hat{X},Y}}{{\sigma_{\hat{X}}}^2} \tag{22}$$

The inconsistency of $\beta_{TSTSLS}$ is now given by (22) minus (21):

$$\frac{\sigma_{\hat{X},Y}}{{\sigma_{\hat{X}}}^2} - \frac{\sigma_{X,Y}}{{\sigma_X}^2} \tag{23}$$

Note that, in this more general framework, $\beta_{TSTSLS}$ can be either upwards or downwards inconsistent. Indeed, the direction and magnitude of the inconsistency depends upon one's ability to correctly estimate the ratio of the covariance between father's and son's earnings ($\sigma_{X,Y}$) to the variance of father's earnings (${\sigma_X}^2$).

Equations (24) to (26) provide analogous expressions for $\rho_{TSTSLS}$. If $X_{true}$ and $Y_{true}$ were available in the main dataset, ρ could be consistently estimated by:

$$Plim\ \rho = \frac{\sigma_{X,Y}}{{\sigma_X}^2}.\frac{\sigma_X}{\sigma_Y} = \frac{\sigma_{X,Y}}{\sigma_X.\sigma_Y} \tag{24}$$

Replacing, $X$ with $\hat{X}$, $\rho_{TSTSLS}$ converges in probability to:

$$Plim\ \rho_{TSTSLS} = \frac{\sigma_{\hat{X},Y}}{{\sigma_{\hat{X}}}^2}.\frac{\sigma_{\hat{X}}}{\sigma_Y} = \frac{\sigma_{\hat{X},Y}}{\sigma_{\hat{X}}.\sigma_Y} \tag{25}$$

with the inconsistency of $\rho_{TSTSLS}$ now given by (25) minus (24):

$$\frac{\sigma_{\hat{X},Y}}{\sigma_{\hat{X}}.\sigma_Y} - \frac{\sigma_{X,Y}}{\sigma_X.\sigma_Y} \tag{26}$$

In our empirical analysis we illustrate how the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ can vary substantially depending on whether $X_{Avg}$ (as a measure of $X_{True}$) or $X_{single}$ is used as the first-stage dependent variable.

To conclude, we note that generated regressors (e.g. $\hat{X}$) are also subject to sampling variation. Consequently, second stage standard errors will be underestimated unless this additional uncertainty is taken into account. Murphy and Topel (1985), Wooldridge (2002) and Inoue and Solon (2010) provide formulae to make an appropriate adjustment to the estimated standard errors, while Björklund and Jäntti (1997), Inoue and Solon (2010) and Piraino (2014) suggest bootstrapping as a viable (if computer intensive) alternative. We do not dwell on this issue in this paper, and focus upon the inconsistency of TSTSLS point estimates. Nevertheless, this additional source of sampling uncertainty should always be taken into account when applying such generated regressor techniques[11].

[11] In our empirical application, we report bootstrapped standard errors. However, as our auxiliary dataset is set to contain 500,000 observations, sampling uncertainty in our generated regressor(s) is only a minor issue.

## 3. Data

The Panel Survey of Income Dynamics (PSID) is a nationally representative sample of US households. It began in 1968, with annual follow-ups to 1997, and bi-annual interviews thereafter. Detailed information has been collected at each sweep from the household head and their partner. Offspring are tracked as they leave the initially sampled household. Consequently, the PSID contains earnings information across multiple years for both fathers and sons. Throughout our analysis we restrict the sample to include sons who were household heads aged between 30 and 60 in 2011, and who reported their earnings for the previous year. Moreover, we only include sons whose father can be identified, has reported annual earnings on at least five occasions during their prime working years (between ages 30 and 60), and where both parent and offspring reports of father's education, occupation and industry are available.

After making these restrictions, our working sample equals 1,024 observations. Table 1 illustrates that approximately 80 percent of these individuals have at least 15 reports of father's annual earnings available, with 60 percent having 20 or more. A 'permanent' measure of father's earnings is created by averaging across all available reports for each sample member. We call this $X_{AVG}$, the closest measure to $X_{True}$ available in the PSID. All earnings data have been adjusted to 2010 prices.

**<< Table 1 >>**

As part of each PSID sweep, fathers were asked detailed questions about their educational attainment, occupation and industry (we label father's reports of these variables as $Z_{FA}$). Education has been recorded using the highest grade ever completed, which we have converted into eight groups (see Table 2). Occupation and industry have been recorded using three digit census codes. These are finely defined categories – separating occupations and industries into approximately 200 groups. We use this detailed information on father's occupation and industry (taken from the year their offspring turned age 15[12]) as the key imputer variables (Z). At times, we also use more broadly defined '1 digit' occupation and industry groups (as presented in Table 2).

**<< Table 2 >>**

[12] Thus the occupation and industry of the average father included in the sample was taken from the 1983 PSID wave, where they were (on average) approximately 40 years old.

Sons also reported similar information about their father's education, occupation and industry (denoted $Z_{CH}$). For instance, in the 2011 sweep, sons were asked:

> How much education did your father complete?
>
> What was your father's usual occupation when you were growing up?
>
> What kind of business or industry was that in?

Information on Z is thus available both directly from fathers ($Z_{FA}$) and indirectly via their sons ($Z_{CH}$). We exploit this in the following section to examine the robustness of TSTSLS mobility estimates to who reports the Z characteristics.

*Creating an auxiliary dataset*

The 1,024 PSID observations described above form our 'main' dataset (PSID-MAIN). To create an auxiliary dataset, we sample *with replacement* from these individuals. This generates an auxiliary sample containing 500,000 observations. (Henceforth PSID-AUX). The intuition behind this approach is similar to creating a single bootstrap re-sample[13]. Specifically, by randomly re-sampling from PSID-MAIN, we create a second random draw of individuals who belong to the same population[14]. This approach has three important advantages. First, one can guarantee that the main and auxiliary datasets are drawn from the same population. Second, the main and auxiliary datasets contain exactly the same variables measured in exactly the same way. Third, the size of the auxiliary dataset is under our control.

We exploit these advantages to produce TSTSLS mobility estimates under 'ideal conditions' (i.e. large auxiliary dataset, identical measurement of key variables across datasets, samples drawn from the same population). This enables us to investigate the consistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ under different choices of the Z (imputer) variables. We then add additional complicating factors into the analysis (e.g. measurement of Z differing across datasets) to investigate the robustness of TSTSLS estimates to other challenges researchers face.

*Methodology*

[13] Indeed, if we were to create an auxiliary dataset of size 1,024, then this would be equivalent to us taking a single bootstrap re-sample.

[14] A random number seed has been set to ensure results are replicable. We have experimented with different random number seeds and found little substantive change to our results.

PSID-AUX is used to impute father's earnings ($\hat{X}$) into PSID-MAIN following the TSTSLS approach. The twist, of course, is that PSID-MAIN also contains an actual observed measure of father's long-run earnings ($X_{AVG}$). One can therefore investigate how intergenerational mobility estimates change when using $\hat{X}$ to measure father's earnings rather than $X_{AVG}$.

The first-stage prediction model, estimated using PSID-AUX, takes the form:

$$X_{AVG} = \alpha + \gamma . Z_{FA} + u \quad (27)$$

$X_{AVG}$= Father's observed time-average earnings

$Z_{FA}$= Father's reports of the imputer variables

The key decision is then which variables to include in $Z_{FA}$. Appendix A provides an overview of those typically used in the literature. There are four common choices:

(i) broad education level - e.g. Dunn (2007)
(ii) broad education and broad occupation - e.g. Björklund and Jäntti (1997)
(iii) broad education, occupation and industry - e.g. Piraino (2007)
(iv) broad education and detailed (3 digit) occupation - e.g. Leigh (2007)

This guides the combination of Z used in this paper. Table 3 illustrates the variables we include in five different first-stage model specifications (henceforth M1 to M5).

**<< Table 3 >>**

Parameter estimates from these first-stage models are presented in Appendix B. These are used to impute father's earnings ($\hat{X}$) into PSID-MAIN:

$$\hat{X} = \hat{\alpha} + \hat{\gamma} . Z_{FA} \quad (28)$$

The following regression model is then estimated six times within PSID-MAIN - once using $X_{AVG}$ to measure father's earnings and five times using the different predictions of $\hat{X}$:

$$Y_{2010} = \alpha + \beta . X + \varepsilon \quad (29)$$

Where:

$Y_{2010}$ = Log annual earnings of sons in 2010

X = Father's earnings (measured using either $X_{AVG}$ or $\hat{X}$)

We then compare estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ (obtained using $\hat{X}$) to $\beta_{OLS}$ and $\rho_{OLS}$ (obtained using $X_{AVG}$).

In our main analysis, son's earnings (Y) are taken from a single year (2010), when they are aged between 30 and 60. Ideally, to minimize the impact of 'life-cycle bias' (Haider and Solon 2006), a tighter age restriction would have been used (e.g. 35 to 45 year old sons only)[15]. Unfortunately, making such a restriction here would result in a significant reduction in sample size. We nevertheless appreciate the importance of this issue, and have hence investigated the sensitivity of our results to (a) restricting the sample of sons to 35 to 45 year olds only (b) using a five-year average of son's earnings. Although there is some evidence of lifecycle bias in our estimates, conclusions regarding the consistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ remain largely unchanged. (All estimates available from the authors upon request).

## 4. Results

This section presents results from our empirical analysis of the PSID. Sub-section 4.1 focuses upon the choice of the instrumental (imputer) variables. Sub-section 4.2 turns to the issue of who reports the information on these Z characteristics (fathers or their sons). Finally, sub-section 4.3 considers the impact of how earnings are measured within the auxiliary dataset.

### *4.1 The choice of instrumental (imputer) variables*

Table 4 compares estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ to $\beta_{OLS}$ and $\rho_{OLS}$. Whereas $\beta_{OLS}$ stands at 0.568[16], TSTSLS estimate M1 equals 0.753, M2 equals 0.767 and M3 0.717. $\beta_{TSTSLS}$ is thus upward inconsistent by approximately 30 percent. $\beta_{TSTSLS}$ declines under M4 and M5 (≈0.65) though the upward inconsistency remains non-trivial (15 percent).

**<<Table 4>>**

To provide further insight into these results, Table 5 panel A presents the components of the inconsistency of $\beta_{TSTSLS}$, corresponding to equations (9) to (12) in section 2. For

[15] Bohlmark and Lindquist (2006) suggest that lifecycle bias is approximately zero when sons are age 38 in the United States.

[16] Using a five-year average of father's earnings, Solon (1992) and Björklund and Jäntti (1997) estimate $\beta_{OLS}$ to be approximately 0.40. However, Mazumder (2005) argues that a five-year average of father's earnings may be insufficient to eliminate problems of measurement error and transitory fluctuations. These estimates may therefore be downward inconsistent. Indeed, Mazumder obtains substantially higher values of $\beta_{OLS}$ (0.61) when averaging father's earnings over 16 years. The fact that we obtain a higher estimate of $\beta_{OLS}$ (0.56) than Solon and Björklund and Jäntti is therefore likely to be due to father's earnings having been averaged over more than 20 years (see Table 1).

example, why is the upward inconsistency of $\beta_{TSTSLS}$ not reduced between M1 and M2, despite the notable increase in the first-stage $R^2$? Table 5 illustrates that the addition of father's occupation (M2) also influences the direct effect of predicted father's earnings on son's earnings ($\lambda_2$); it increases from 0.30 to 0.36 as the $R^2$ moves from 0.38 to 0.45. In terms of consistency, losses due to the former are not offset by gains from the latter. Consequently, the upward inconsistency of $\beta_{TSTSLS}$ increases from 0.185 to 0.199. This illustrates how simply choosing '*the instruments in order for the $R^2$ of the* [first-stage] *regression be as high as possible'* (Cervini-Pla 2012:9) will not necessarily reduce the inconsistency of $\beta_{TSTSLS}$. Indeed, the addition of variables which influence $\lambda_2$ as well as the first-stage $R^2$ can actually do more harm than good.

Table 5 Panel A also reveals that two factors drive the big reduction in the inconsistency between M3 and M4. The first is the large increase in the standard deviation of father's predicted earnings ($\sigma_{\hat{X}}$) from 0.385 to 0.449. This, via equation (11), substantially increases the first-stage $R^2$. The second is the decrease in $\lambda_2$, which falls from 0.29 to 0.21. Why is there then no further reduction of the inconsistency between M4 and M5? Table 5 reveals that although $\sigma_{\hat{X}}$ (and thus $R^2$) increase, $\lambda_2$ approximately returns back to its level under M3 (0.29). The effect of the former cancels out the latter, meaning no net gain regarding the consistency of $\beta_{TSTSLS}$.

**<<Table 5>>**

Returning to Table 4, $\rho_{OLS}$ equals is 0.316. The TSTSLS M1 estimate is 0.259; *downward* inconsistency of approximately 18 percent. However $\rho_{TSTSLS}$ increases as additional $Z_{FA}$ variables are added to the prediction model, with the downward inconsistency standing at 12 percent using M3 ($\rho_{TSTSLS}$ = 0.277), and essentially zero using M5 ($\rho_{TSTSLS}$ = 0.307). The inconsistency of $\rho_{TSTSLS}$ therefore tends to be (a) in the opposite direction (b) smaller in magnitude and (c) less sensitive to the combination of the Z variables than the inconsistency of $\beta_{TSTSLS}$. Indeed, Table 4 illustrates how $\rho_{TSTSLS}$ is not usually too far from $\rho_{OLS}$. This is important given that, of the near 30 studies applying TSTSLS reviewed in Appendix A, only Björklund and Jäntti (1997) report the intergenerational correlation.

Table 5 Panel B splits the inconsistency of $\rho_{TSTSLS}$ into two components: part A (corresponding to equation 17) and part B (corresponding to equation 18). Recall how the former induces downward inconsistency in $\rho_{TSTSLS}$, while the latter leads to upward

inconsistency. It becomes clear that the comparatively small inconsistency of $\rho_{TSTSLS}$ (relative to the inconsistency of $\beta_{TSTSLS}$) is due to these two components partially cancelling one another out. However, the downward pressure induced by part A is always slightly greater than the upward pressure from part B, leading to the overall downward inconsistency of $\rho_{TSTSLS}$.

What happens as additional variables are added to the prediction model? First, the downward pressure induced by part A is always reduced. This is because the standard deviation of father's predicted earnings ($\sigma_{\hat{X}}$) is the only term within equation A that changes (see equation 17), and can only increase towards the 'true' value ($\sigma_X$) as variables are added to the prediction model. In contrast, part B includes ($\frac{\sigma_{\hat{X}}}{\sigma_Y}$) and $(1 - R^2)$[17], with a greater value of $\sigma_{\hat{X}}$ increasing the former but decreasing the latter. Moreover, $\lambda_2$ is also found in component B, which fluctuates in value between M1 and M5. Thus, whereas adding information to the prediction model clearly reduces the inconsistency induced by part A, the influence on part B is hard to predict. Our empirical analysis does suggest, however, that gains from the former more than offset any losses from the latter. Consequently, the inconsistency of $\rho_{TSTSLS}$ does generally decline when information is added to the first-stage prediction model.

To conclude this sub-section, we present estimates of rank order mobility (i.e. father's and son's relative position in the earnings distribution). Figure 2 provides a selection of findings from estimated transition matrices. (See Appendix C for full results). The top set of bars illustrate the percent of sons in each earnings quartile given that their father is in the *top* earnings quartile. The bottom set of bars presents analogous results for the sons of fathers in the *bottom* earnings quartile. Interestingly, TSTSLS estimates compare relatively well. For instance, using time-average father's earnings, 40 percent of sons with fathers in the bottom earnings quartile remain in the bottom quartile (white segment of the bottom set of bars), while just 11 percent rise to the top quartile (black segment bottom set of bars). The TSTSLS estimates produce very similar results – even when the imputation model is relatively sparse (e.g. 38 percent and 10 percent respectively using prediction model M1). Moreover, although there is slight underestimation of the probability that sons of high earning fathers will remain in the top quartile (black segments in the top set of bars), there nevertheless remains a high degree of consistency between the TSTSLS and time-average results. In additional analyses

[17] See equation (11) for the relationship between $\sigma_{\hat{X}}$ and R.

(available upon request) we follow Chetty et al (2014) and Gregg, MacMillian and Vittori (2014) and produce rank-rank mobility estimates using TSTSLS. Key findings are very similar to those for the transition matrices presented above.

**<< Figure 2 >>**

Why is this relevant to our discussion of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$? It illustrates how TSTSLS captures *rank order* mobility (i.e. father's and son's position in the earnings distribution) remarkably well. It thus provides further evidence that the inconsistency of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ is largely being driven by scale miss-measurement (e.g. difficulties in accurately capturing the variance of father's earnings) rather than fathers being placed in the wrong part of the earnings distribution.

*4.2 Measurement of imputer variables (Z)*

The above investigation took place under 'ideal conditions', with identical measurement of key variables across main and auxiliary datasets. We now investigate the impact of the imputer variables being measured using son's recall of their father's characteristics ($Z_{CH}$) in the main dataset, while individuals own reports are used within the auxiliary dataset ($Z_{FA}$).

First, we investigate the uniformity of parent ($Z_{FA}$) and offspring ($Z_{CH}$) reports of father's education, occupation and industry. Appendix D provides full cross-tabulations, with summary results in Table 6. This includes the percentage of occasions where father's and son's report the same category ('percentage correct') and Kappa statistics of inter-rater reliability (a statistic which adjusts for agreement occurring by chance). Kappa statistics range from -1 (complete disagreement) to +1 (complete agreement) with Landis and Koch (1977) providing the following rules of thumb:

- 0-0.20 'Slight' agreement (between parent and child reports)
- 0.21–0.40 'fair' agreement
- 0.41–0.60 'moderate' agreement
- 0.61–0.80 'substantial' agreement
- 0.81–0.99 'almost perfect' agreement

**<< Table 6 >>**

Fathers and sons report the same education and industry on more than 60 percent of occasions. Kappa statistics (0.52 and 0.55) are towards the top end of Landis and Koch's 'moderate' agreement category, with 'substantial agreement' when weighted Kappa is used (0.72 and 0.67)[18]. In contrast, just 27 percent of father's and son's report the same category for father's occupation, with Kappa statistics suggesting agreement is 'slight' (0.16) to 'fair' (0.28). One potential explanation is sons were asked about their father's occupation at a vague time point ('*what was your father's occupation when you were growing up*?') which we have compared to the job father's reported holding when sons were age 15. Consequently, we are unable to establish whether this lack of agreement is due to son's inability to accurately recall their father's occupation, or different interpretation of the questions asked (e.g. son's recalling their father's occupation at a different age).

Table 7 illustrates how switching to offspring reports of the imputer variables ($Z_{CH}$) influences estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$. Overall, this has relatively little impact upon our results. For instance, $\beta_{TSTSLS}$ ($\rho_{TSTSLS}$) is estimated to be 0.767 (0.286) when using imputation model M2 and *father's* reports ($Z_{FA}$). This changes to 0.858 (0.291) when using son's reports instead ($Z_{CH}$). Similarly, under imputation model M5, estimates of $\beta_{TSTSLS}$ ($\rho_{TSTSLS}$) stand at 0.642 (0.307) using father's reports, and 0.662 (0.292) using son's reports. Differences are therefore usually quite small, though on certain occasions are non-trivial. Nevertheless, our empirical analysis overall suggests that TSTSLS estimates are fairly robust to this particular measurement issue.

*4.3 Imputation of current versus time-average father's earnings*

Does changing the first-stage dependent variable from $X_{Avg}$ to $X_{single}$ influence $\beta_{TSTSLS}$ or $\rho_{TSTSLS}$? Table 8 provides results, with $X_{single}$ measured using father's earnings in 1980 (or the closest available year)[19].

**<< Table 8>>**

Key findings remain largely unaltered under M1, M2 and M3; large upward inconsistency in $\beta_{TSTSLS}$ remains, with slight downward inconsistency in $\rho_{TSTSLS}$. However, $\beta_{TSTSLS}$ is now much smaller under M4 and M5. For instance, under M5 $\beta_{TSTSLS}$ was 0.642 when using $X_{AVG}$

[18] See Table 6 notes for how weighted Kappa is defined.

[19] Everything else is left unaltered. We have experimented with altering the year used to measure father's occupation and industry and found little change to the results. Father's reports of the imputer variables ($Z_{FA}$) are used within both datasets.

(upward inconsistency of 15 percent). But, after changing the first-stage dependent variable to $X_{single}$, $\beta_{TSTSLS}$ falls to 0.415 (*downward* inconsistency of 25 percent). Similarly, $\rho_{TSTSLS}$ using M5 is now 0.230 (downward inconsistency of 25 percent) having previously stood at 0.307 (downward inconsistency of one percent).

Table 9 breaks these TSTSLS estimates down into their respective components (corresponding to equation 22 for $\beta_{TSTSLS}$ and equation 25 for $\rho_{TSTSLS}$). To begin, the covariance between father's and son's earnings (i.e. the common numerator of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$) is similar – although always marginally smaller – using $X_{single}$. For instance, $\sigma_{\hat{x},y}$ under M3 falls from 0.106 using $X_{AVG}$ to 0.098 using $X_{single}$. Likewise, under M1, M2 and M3, the variance of predicted father's earnings ($\sigma_{\hat{x}}^2$) does not seem sensitive to the choice of the first-stage dependent variable (e.g. for M3, $\sigma_{\hat{x}}^2$ is 0.148 using $X_{AVG}$ and 0.145 using $X_{single}$). Consequently, none of the key components of $\beta_{TSTSLS}$ or $\rho_{TSTSLS}$ are particularly influenced by the use of $X_{single}$ rather than $X_{AVG}$ when the first-stage prediction model is relatively sparse. Hence estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ are similar whichever earnings measure ($X_{AVG}$ or $X_{single}$) is used.

**<<Table 9>>**

The same does not hold true, however, under M4 and M5. Specifically, the variance of father's earnings ($\sigma_{\hat{x}}^2$) is significantly bigger when the first-stage dependent variable is $X_{Single}$. In contrast, the covariance between father's predicted earnings and son's earnings tends to be slightly smaller. Using M5 as an example, $\sigma_{\hat{x}}^2$ rises from 0.228 ($X_{AVG}$) to 0.305 ($X_{Single}$), while $\sigma_{\hat{x},y}$ falls from 0.146 ($X_{AVG}$) to 0.127 ($X_{Single}$). Thus, while the denominator of $\beta_{TSTSLS}$ ($\sigma_{\hat{x}}^2$) has substantially *increased* (and is now almost identical to the denominator of $\beta_{OLS}$) the numerator ($\sigma_{\hat{x},y}$) has slightly *decreased* (and remains 26 percent below the numerator of $\beta_{OLS}$). This causes $\beta_{TSTSLS}$ to become *downwardly* inconsistent. Whether one uses $X_{AVG}$ or $X_{Single}$ as the first-stage dependent variable therefore seems to have much more influence upon the key components of $\beta_{TSTSLS}$ when a detailed set of Z characteristics are included in the first-stage prediction model.

Building upon the intuition above, the *standard deviation* of father's predicted earnings ($\sigma_{\hat{x}}$) also enters the denominator of $\rho_{TSTSLS}$. The increase in $\sigma_{\hat{x}}$ from using $X_{Single}$ as the first-stage dependent variable (as opposed to $X_{AVG}$) therefore also puts downward

pressure on $\rho_{TSTSLS}$[20]. Indeed, when using $X_{Single}$, $\rho_{TSTSLS}$ actually moves further away from $\rho_{OLS}$ as Z variables are added to the first-stage prediction model. For instance, the TSTSLS M2 estimate of ρ (0.271) is much closer to the OLS value (0.315) than the estimate obtained under M5 (0.230). In other words, the inconsistency of $\rho_{TSTSLS}$ has *increased* in absolute magnitude, driven by the greater variability in father's predicted earnings. This is in direct contrast to results using $X_{AVG}$ (presented on the left hand side of Table 9) where adding Z variables to the prediction model almost always brought $\rho_{TSTSLS}$ and $\rho_{OLS}$ closer together (i.e. *decreased* the inconsistency).

These results have important implications. First, changing the first-stage dependent variable can lead to rather different estimates of earnings mobility. Second, it is only safe to assume $\beta_{TSTSLS}$ is upward inconsistent if $X_{True}$ is the first-stage dependent variable (i..e. the earnings measure being imputed into the main dataset). Third, this strengthens the empirical evidence that TSTSLS estimates of the intergenerational correlation are typically downward inconsistent. Finally, even subtle changes to the imputation model can make important differences to $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$.

**<< Table 8 >>**

## 5. Conclusions

Intergenerational earnings mobility is a topic of great academic and policy concern. However, producing consistent estimates of earnings mobility is not a trivial task. In many countries earnings data cannot be linked across generations. Consequently, several studies estimate earnings mobility using TSTSLS instead. This paper has presented new evidence on the consistency of earnings mobility estimates based upon this methodology.

A summary of our results can be found in Table 10. This illustrates the sensitivity of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ to using different first-stage imputation models and measurement of key variables. Column 1 indicates whether $X_{Single}$ (1980) or $X_{AVG}$ (AVG) is the first-stage dependent variable. Column 2 indicates whether father's (FA) or son's (CH) reports of Z are used, while column 3 provides the specification of the prediction model (to be cross-referenced with Table 3). Columns 4 and 5 provide estimates of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$, with shading illustrating the absolute degree of inconsistency. The following findings emerge:

[20] The impact is less pronounced than for $\beta_{TSTSLS}$ due to the *standard deviation* of father's predicted earnings being the key term rather than the variance.

- $\beta_{TSTSLS}$ is often (although not always) upwardly inconsistent.
- $\beta_{TSTSLS}$ is particularly sensitive to the choice and measurement of the first stage imputation model. Estimates are up to 50 percent upwardly inconsistent or 30 percent downwardly inconsistent.
- Estimates of $\rho_{TSTSLS}$ tend to be more stable and suffer less inconsistency. Of the 20 estimates in Table 10, 14 lie within 20 percent of $\rho_{OLS}$, with five within ten percent.
- Although the inconsistency of $\rho_{TSTSLS}$ can in theory be in either direction, our empirical analysis suggests that, in practise, they tend to be below $\rho_{OLS}$.

**<< Table 10 >>**

Based upon our findings, we provide the following guidance to researchers wishing to estimate earnings mobility using TSTSLS. First, $\rho_{TSTSLS}$ and $\beta_{TSTSLS}$ should both be reported where possible. But, if a choice has to be made, our empirical analysis suggests there may be reasons to prefer the former over the latter[21]. Second, the auxiliary and main datasets should contain information on educational attainment and *detailed* (3 digit) occupation as a minimum. This means that at least two first-stage specifications can be estimated – a 'broad' specification (as per our model M2 or M3) and a 'detailed' specification (as per our model M4 or M5). One can then investigate how this changes estimates of $\rho_{TSTSLS}$ and $\beta_{TSTSLS}$, including a breakdown into their separate components (as per our Table 9). Third, the auxiliary dataset should ideally contain information on respondents' time-average earnings ($X_{AVG}$). The use of cross-sectional data with respondents' earnings reported at a single time-point (e.g. a labour force survey) should be considered a second-best alternative. Fourth, as briefly discussed in section 2, standard errors should be corrected to account for the sampling variation in the predictions of father's earnings. This can be done via a Murphy-Topel correction (Murphy and Topel 1985) or appropriate application of a bootstrap technique (Inoue and Solon 2010; Björklund and Jäntti 1997)[22]. Fifth, researchers should note that their estimates of earnings mobility may differ from other studies due to methodological rather than substantive reasons. This includes instances where TSTSLS has been used in rather different ways (e.g. different combinations, definitions and measurement of key variables).

[21] At the same time, it is important to recognise that 'classical' measurement error in son's earnings will lead to inconsistent estimates of ρ but not β (Black and Devereux 2011). Counter-arguments can therefore be made as to why one may prefer β over ρ – hence our advice that both should be reported whenever possible.
[22] Hardin (2002) and Hole (2006) illustrate how this can be implemented in Stata.

Finally, we urge great care to be taken when comparing mobility estimates across studies – and across countries - where different methodologies have been applied.

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**Table 1. Number of father's earnings observations available**

| Number of father's earnings observations | % | Cumulative % |
|---|---|---|
| 6 | 1 | 1 |
| 7 | 1 | 1 |
| 8 | 1 | 3 |
| 9 | 2 | 4 |
| 10 | 1 | 6 |
| 11 | 3 | 8 |
| 12 | 2 | 11 |
| 13 | 3 | 14 |
| 14 | 3 | 17 |
| 15 | 2 | 19 |
| 16 | 4 | 23 |
| 17 | 3 | 26 |
| 18 | 4 | 30 |
| 19 | 5 | 35 |
| 20 | 6 | 41 |
| 21 | 8 | 49 |
| 22 | 7 | 56 |
| 23 | 7 | 63 |
| 24 | 6 | 70 |
| 25 | 8 | 78 |
| 26 | 7 | 84 |
| 27 | 5 | 89 |
| 28 | 5 | 94 |
| 29 | 4 | 97 |
| 30 | 3 | 100 |
| **n** | **1,024** | |

Notes: Author calculations using the PSID dataset.

**Table 2. Education, broad (1 digit) occupation and broad (1 digit) industry categories**

| Education | Occupation | Industry |
|---|---|---|
| No education = 0 grades completed | Professional | Agriculture |
| Grades 1 to 5 | Managers / senior administrators | Mining |
| Grades 6 to 8 | Sales workers | Construction |
| Grades 9 to 12 | Clerical | Manufacturing |
| High school = 12 grades | Craftsman | Transport and communication |
| Some college = grades 13 to 15 | Operatives | Wholesale and retail |
| College degree = grade 16 | Transport | Finance |
| Advanced college degree = grade 17 | Laborers | Business services |
| | Farmers | Personal services |
| | Service workers | Entertainment |
| | | Professional services |
| | | Public administration |

**Notes**: Refers to information on father's education, broad occupation and broad industry available within the PSID.

**Table 3. The imputer (Z) variables used in the first-stage prediction models**

| | M1 | M2 | M3 | M4 | M5 |
|---|---|---|---|---|---|
| Race | √ | √ | √ | √ | √ |
| Education | √ | √ | √ | √ | √ |
| Occupation (1 digit) | - | √ | √ | - | - |
| Occupation (3 digit) | - | - | - | √ | √ |
| Industry (1 digit) | - | - | √ | √ | - |
| Industry (3 digit) | - | - | - | - | √ |

**Notes**: M1 to M5 refers to the five different specifications of the first stage prediction model. All variables refer to characteristics of PSID fathers.

**Table 4. Estimates of the intergenerational elasticity (β) and correlation (ρ) using different TSTSLS imputation models**

| TSTSLS model | First-stage $R^2$ | Elasticity | | Correlation | |
|---|---|---|---|---|---|
| | | $\beta_{TSTSLS}$ | SE | $\rho_{TSTSLS}$ | SE |
| M1 | 0.385 | 0.753 | 0.087 | 0.259 | 0.030 |
| M2 | 0.449 | 0.767 | 0.080 | 0.286 | 0.030 |
| M3 | 0.483 | 0.717 | 0.077 | 0.277 | 0.030 |
| M4 | 0.658 | 0.641 | 0.066 | 0.289 | 0.030 |
| M5 | 0.742 | 0.642 | 0.062 | 0.307 | 0.030 |
| **OLS** | - | **0.568** | **0.053** | **0.316** | **0.029** |

**Notes:** Authors' calculations using the PSID dataset. Sample restricted to the same 1,024 individuals across all specification. SE stands for standard error. M1 to M5 indicate which first-stage TSTSLS imputation model has been used (see Table 3). Estimates using observed time-average father's earnings (OLS) reported in the bottom row. A full set of first-stage parameter estimates can be found in Appendix B.

**Table 5. Estimates of the inconsistency of TSTSLS earnings mobility estimates**

**(a) Elasticity**

| | M1 | M2 | M3 | M4 | M5 |
|---|---|---|---|---|---|
| $\lambda_2$ | 0.300 | 0.361 | 0.287 | 0.213 | 0.283 |
| $\sigma_{\hat{X}}$ | 0.343 | 0.371 | 0.385 | 0.449 | 0.477 |
| $\sigma_X$ | 0.554 | 0.554 | 0.554 | 0.554 | 0.554 |
| $\sigma_{\hat{X},X}$ | 0.118 | 0.138 | 0.148 | 0.202 | 0.228 |
| $R^2$ | 0.385 | 0.449 | 0.483 | 0.658 | 0.742 |
| $\beta_{OLS}$ | 0.568 | 0.568 | 0.568 | 0.568 | 0.568 |
| $\beta_{TSTSLS}$ | 0.753 | 0.767 | 0.717 | 0.641 | 0.642 |
| Inconsistency | 0.185 | 0.199 | 0.149 | 0.073 | 0.073 |

**(b) Correlation**

| | M1 | M2 | M3 | M4 | M5 |
|---|---|---|---|---|---|
| $\beta_{OLS}$ | 0.568 | 0.568 | 0.568 | 0.568 | 0.568 |
| $\sigma_{\hat{X}}$ | 0.343 | 0.371 | 0.385 | 0.449 | 0.477 |
| $\sigma_X$ | 0.554 | 0.554 | 0.554 | 0.554 | 0.554 |
| $\sigma_Y$ | 0.995 | 0.995 | 0.995 | 0.995 | 0.995 |
| **Inconsistency part A** | **-0.120** | **-0.105** | **-0.097** | **-0.060** | **-0.044** |
| $\lambda_2$ | 0.300 | 0.361 | 0.287 | 0.213 | 0.283 |
| $\sigma_{\hat{X}}$ | 0.343 | 0.371 | 0.385 | 0.449 | 0.477 |
| $\sigma_Y$ | 0.995 | 0.995 | 0.995 | 0.995 | 0.995 |
| $R^2$ | 0.385 | 0.449 | 0.483 | 0.658 | 0.742 |
| **Inconsistency part B** | **0.064** | **0.075** | **0.058** | **0.033** | **0.035** |
| $\rho_{OLS}$ | 0.316 | 0.316 | 0.316 | 0.316 | 0.316 |
| $\rho_{TSTSLS}$ | 0.259 | 0.286 | 0.277 | 0.289 | 0.307 |
| **Inconsistency** | **-0.057** | **-0.030** | **-0.039** | **-0.027** | **-0.009** |

**Notes:** Authors' calculations using the PSID dataset. M1 to M5 refer to the TSTSLS imputation model specification used (see Table 3). See equation (11) and (12) for the components of the intergenerational elasticity and equations (16) to (18) for the components of the intergenerational correlation.

**Table 6. The agreement between parent and offspring reports of father's education, occupation and industry**

| | Education | Occupation (broad groups) | Industry (broad groups) |
|---|---|---|---|
| Percent agreement | 62 | 27 | 61 |
| Kappa | 0.52 | 0.16 | 0.55 |
| Weighted Kappa | 0.72 | 0.28 | 0.67 |

**Notes**: Authors' calculations using the PSID dataset. See Appendix D for full cross-tabulations. The Kappa statistic is a measure of inter-rater reliability that adjusts for agreement occurring by chance. It ranges from -1 (complete disagreement) to +1 (complete agreement) with 0 indicating no agreement. Landis and Koch (1977) provide rules of thumb for interpreting levels of agreement using Kappa: 0.01–0.20 'slight', 0.21–0.40 'fair', 0.41–0.60 'moderate', 0.61–0.80 'substantial', and 0.81–0.99 'almost perfect'. Weighted Kappa is where categories further apart (e.g. father reports high school and offspring reports bachelor degree) are considered to show greater levels of disagreement than categories closer together (e.g. father reports associates degree and offspring reports bachelor degree).

**Table 7. TSTSLS estimates of the intergenerational correlation and elasticity when son's reports of father's Z characteristics**

| | $\beta_{TSTSLS}$ | | $\rho_{TSTSLS}$ | |
|---|---|---|---|---|
| **TSTSLS model** | **Father's reports** $(Z_{FA})$ | **Son's reports** $(Z_{CH})$ | **Father's reports** $(Z_{FA})$ | **Son's reports** $(Z_{CH})$ |
| M1 | 0.753 | 0.800 | 0.259 | 0.264 |
| M2 | 0.767 | 0.858 | 0.286 | 0.291 |
| M3 | 0.717 | 0.815 | 0.277 | 0.292 |
| M4 | 0.641 | 0.689 | 0.289 | 0.276 |
| M5 | 0.642 | 0.662 | 0.307 | 0.292 |
| **OLS** | **0.568** | | **0.316** | |

**Notes**: Authors' calculations using the PSID dataset. Sample restricted to the same 1,024 individuals across all specification. Table illustrates how $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ differ when using son's reports $(Z_{CH})$ of their father's characteristics (e.g. education, occupation and industry) rather than using father's own reports $(Z_{FA})$. M1 to M5 refer to the specification of the TSTSLS imputation model used (see Table 3). Estimates using observed time-average father's earnings (OLS) reported in the bottom row.

**Table 8. Estimates of the intergenerational correlation and elasticity using different first stage dependent variables**

| | $\beta_{TSTSLS}$ | | $\rho_{TSTSLS}$ | |
|---|---|---|---|---|
| | $X_{AVG}$ | $X_{Single}$ | $X_{AVG}$ | $X_{Single}$ |
| M1 | 0.753 | 0.798 | 0.259 | 0.251 |
| M2 | 0.767 | 0.741 | 0.286 | 0.270 |
| M3 | 0.712 | 0.678 | 0.277 | 0.259 |
| M4 | 0.641 | 0.476 | 0.289 | 0.236 |
| M5 | 0.642 | 0.415 | 0.307 | 0.230 |
| **OLS** | **0.568** | | **0.316** | |

**Notes**: Authors' calculations using the PSID dataset. Sample restricted to the same 1,024 individuals across all specification. $X_{AVG}$ where time-average father's earnings is the dependent variable in the first stage imputation model (i.e. 'ideal conditions'). $X_{Single}$ where father's 1980 earnings is the dependent variable in the first stage imputation model. M1 to M5 refer to the specification of the TSTSLS imputation model used (see Table 3).

**Table 9. The numerator and denominator of $\beta_{TSTSLS}$ and $\rho_{TSTSLS}$ when 'current' earnings used as the first-stage dependent variable**

**(a) Intergenerational elasticity**

| | First-stage dependent variable = $X_{AVG}$ | | | | | First-stage dependent variable = $X_{Single}$ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $\sigma_{\hat{x},y}$ | | $\sigma_{\hat{x}}^2$ | | | $\sigma_{\hat{x},y}$ | | $\sigma_{\hat{x}}^2$ | |
| | $\beta_{TSTSLS}$ | Value | % | Value | % | $\beta_{TSTSLS}$ | Value | % | Value | % |
| **M1** | 0.753 | 0.089 | -49 | 0.118 | -62 | 0.798 | 0.078 | -55 | 0.098 | -68 |
| **M2** | 0.767 | 0.106 | -39 | 0.138 | -55 | 0.741 | 0.098 | -44 | 0.132 | -57 |
| **M3** | 0.717 | 0.106 | -39 | 0.148 | -52 | 0.678 | 0.098 | -44 | 0.145 | -53 |
| **M4** | 0.641 | 0.129 | -26 | 0.202 | -34 | 0.476 | 0.116 | -33 | 0.244 | -20 |
| **M5** | 0.642 | 0.146 | -16 | 0.228 | -26 | 0.415 | 0.127 | -27 | 0.305 | -1 |
| **OLS** | **0.568** | **0.175** | **-** | **0.307** | **-** | **0.568** | **0.175** | **-** | **0.307** | **-** |

**(b) Intergenerational correlation**

| | First-stage dependent variable = $X_{AVG}$ | | | | | | First-stage dependent variable = $X_{Single}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $\sigma_{\hat{x},y}$ | | $\sigma_{\hat{x}}$ | | $\sigma_y$ | | $\sigma_{\hat{x},y}$ | | $\sigma_{\hat{x}}$ | | $\sigma_y$ |
| | $\rho_{TSTSLS}$ | Value | % | Value | % | | $\rho_{TSTSLS}$ | Value | % | Value | % | |
| **M1** | 0.260 | 0.089 | -49 | 0.343 | -38 | 1.00 | 0.251 | 0.078 | -55 | 0.312 | -44 | 1.00 |
| **M2** | 0.286 | 0.106 | -39 | 0.371 | -33 | 1.00 | 0.271 | 0.098 | -44 | 0.364 | -34 | 1.00 |
| **M3** | 0.277 | 0.106 | -39 | 0.385 | -31 | 1.00 | 0.259 | 0.098 | -44 | 0.381 | -31 | 1.00 |
| **M4** | 0.289 | 0.129 | -26 | 0.449 | -19 | 1.00 | 0.236 | 0.116 | -33 | 0.494 | -11 | 1.00 |
| **M5** | 0.308 | 0.146 | -16 | 0.477 | -14 | 1.00 | 0.230 | 0.127 | -27 | 0.553 | 0 | 1.00 |
| **OLS** | **0.317** | **0.175** | **-** | **0.554** | **-** | **1.00** | **0.315** | **0.175** | **-** | **0.554** | **-** | **1.00** |

**Notes:** Authors' calculations using the PSID dataset. M1 to M5 refer to the TSTSLS imputation model specification used (see Table 3). $X_{AVG}$ where time-average father's earnings is the dependent variable in the first stage imputation model. $X_{Single}$ where father's 1980 earnings is the dependent variable in the first stage imputation model. 'Value' presents the value of the statistic in question. '%' illustrates percentage underestimation relative to OLS results.

**Table 10. A comparison of TSTSLS estimates using different measures of key variables and different imputation model specifications**

| (1) First-stage dependent variable | (2) Father / son reports of Z | (3) Imputer variables (Z) | (4) $\beta_{TSTSLS}$ | (5) $\rho_{TSTSLS}$ |
|---|---|---|---|---|
| AVG | CH | M2 | 0.858 | 0.291 |
| AVG | CH | M3 | 0.815 | 0.292 |
| 1980 | CH | M1 | 0.807 | 0.248 |
| 1980 | CH | M2 | 0.806 | 0.259 |
| AVG | CH | M1 | 0.800 | 0.264 |
| 1980 | FA | M1 | 0.798 | 0.250 |
| AVG | FA | M2 | 0.767 | 0.286 |
| AVG | FA | M1 | 0.752 | 0.259 |
| 1980 | FA | M2 | 0.741 | 0.270 |
| 1980 | CH | M3 | 0.731 | 0.263 |
| AVG | FA | M3 | 0.717 | 0.277 |
| AVG | CH | M4 | 0.689 | 0.276 |
| 1980 | FA | M3 | 0.678 | 0.259 |
| AVG | CH | M5 | 0.662 | 0.292 |
| AVG | FA | M5 | 0.642 | 0.307 |
| AVG | FA | M4 | 0.641 | 0.289 |
| **OLS benchmark** | | | **0.568** | **0.316** |
| 1980 | FA | M4 | 0.476 | 0.236 |
| 1980 | CH | M4 | 0.472 | 0.213 |
| 1980 | FA | M5 | 0.415 | 0.230 |
| 1980 | CH | M5 | 0.349 | 0.183 |

**Notes**: Authors' calculations using the PSID dataset. Auxiliary dataset sample size set to 500,000 observations. 'Imputer variables' refers to the Z variables used to predict father's earnings (see Table 3). AVG / 1980 refers to the first-stage dependent variable (AVG = time-average; 1980 = single measure of father's earnings in 1980). FA/CH indicates whether father's or son's reports of the Z characteristics used in the main dataset.

Absolute difference relative to time-average benchmark less than 10%

Difference relative to time-average benchmark 10% to 20%

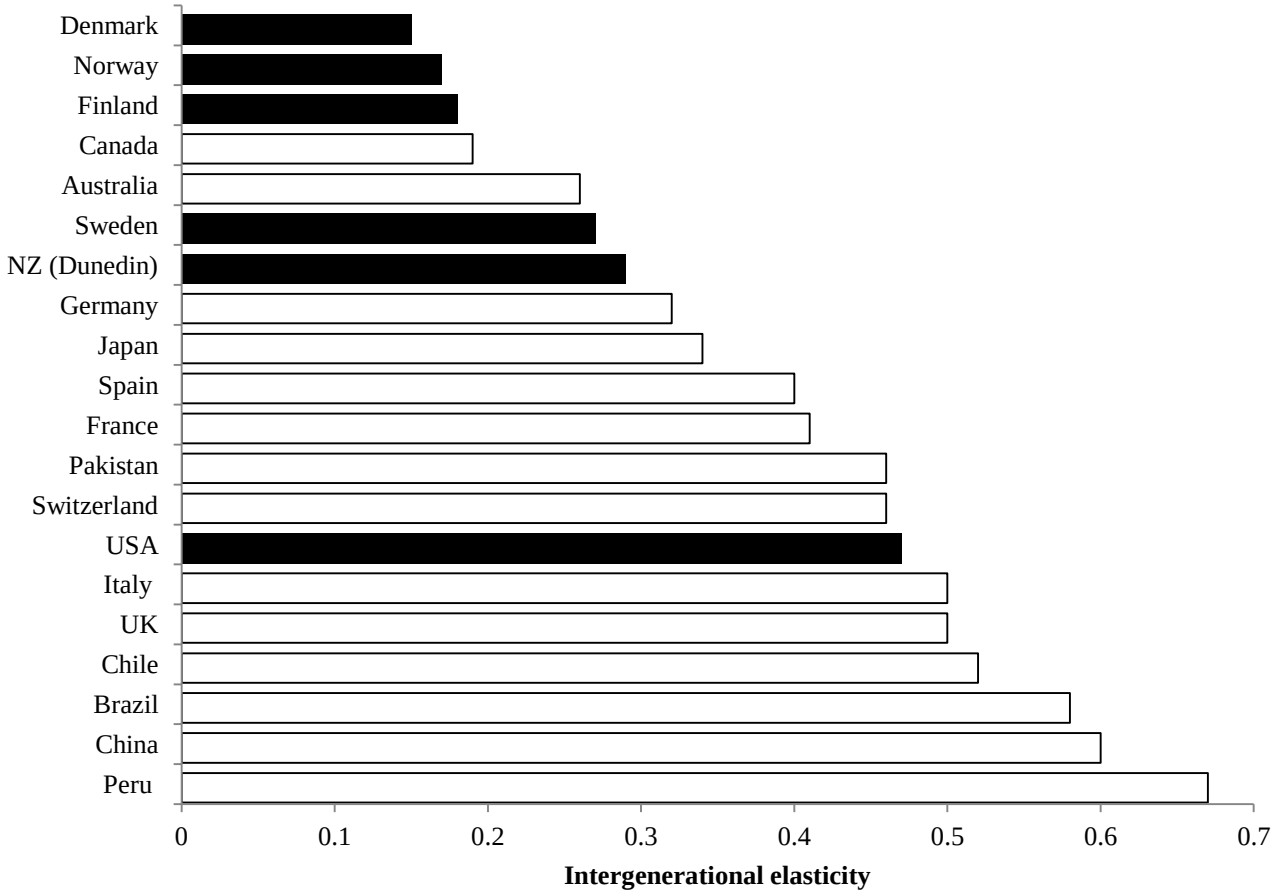
Difference relative to time-average benchmark 20% to 30%

Difference relative to time-average benchmark 30% to 40%

Difference relative to time-average benchmark 40% to 50%

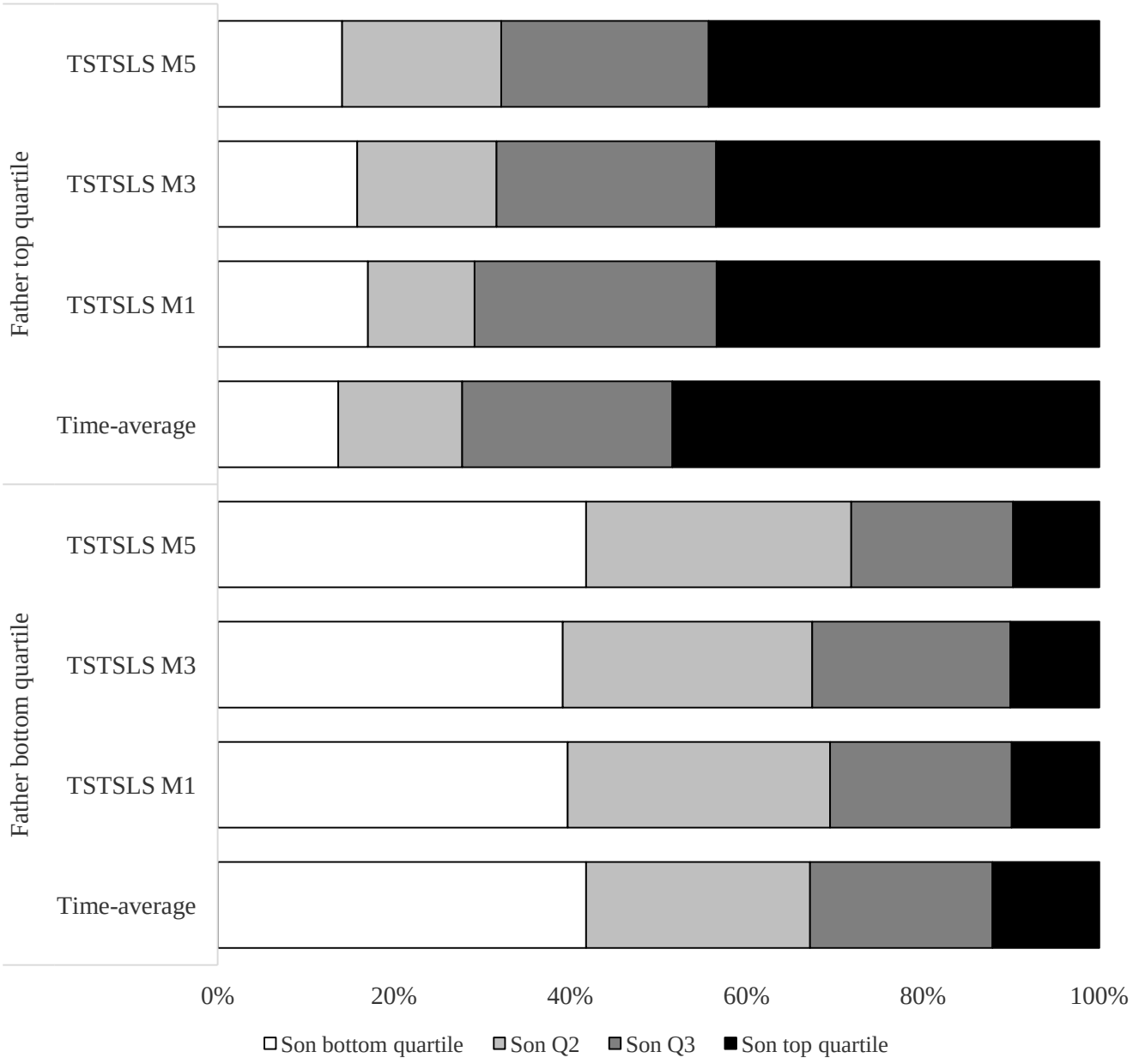
Difference relative to time-average benchmark >50%

**Figure 1. An international comparison of intergenerational earnings mobility**




Notes: Estimates drawn from Corak (2012). New Zealand (NZ) data based upon a sample born in Dunedin and is not nationally representative. The colour of the bar indicates the estimation strategy used. Black bars indicate where OLS regression with time-average parental earnings has been used. White bars indicate where TSTSLS has been applied.

**Figure 2. The estimated earnings quartile of sons, conditional upon their father being in the top (bottom) earnings quartile**




**Notes**: Authors' calculations using the PSID dataset. Top set of bars illustrates the percent of sons in each earnings quartile given that their father is in the *top* earnings quartile. Bottom set of bars present analogous estimates for sons whose fathers are in the *bottom* earnings quartile. 'Time-average' where father's (observed) time-average earnings used to produce mobility estimates. TSTSLS estimates presented for imputation model specifications M1, M3 and M5 (see Table 3 for further details). Full cross-tabulations are presented in Appendix C.

## Appendix A. Intergenerational mobility papers imputing father's earnings using TSTSLS

| | Country | Sample size (Main data) | Offspring' income | Sample size (Auxiliary) | Imputer variables and 1st stage $R^2$ |
|---|---|---|---|---|---|
| Aaronson and Mazumder (2008) | United States | Men, 25-54 years old, born btw 1921 and 1975. | Earnings | 1940-1970: 1% sample<br>1980-2000: 5% sample | State of birth<br><br>$R^2$: Not reported |
| Andrews and Leigh (2009) | 16 countries | Not reported | Son's log hourly wage. | Not reported | 192 Occupation dummies (off-spring reported)<br>$R^2$: Not reported |
| Bauer (2006) | Switzerland | 2,138 | Average earnings from work | 41,362 | Occupation (9 dummies)<br>Education (7 dummies)<br>Swiss citizen dummy<br>$R^2 = 0.27$ |
| Bidisha (2013) | United Kingdom | 3.823 | Average log wages of full time workers and earnings of self-employees over the panel | 935 | Education (3 dummies), occupation (3 dummies); immigrant status; ethnic group; professional level (4 dummies); cohort (2 dummies); Hope-Goldthrope score;<br><br>R2=0.323 |
| Björklund and Jantti (1997) | Sweden and USA | Sweden: 327<br><br>US: Not reported | Annual log earnings and capital market income | Sweden: 540<br><br>US: Not reported | Education (2 dummies);<br>Occupation (8 dummies);<br>Living in Stockholm<br>Note: Children reports<br><br>R2: Not reported |
| Cavagla (2014) | Germany, Italy, UK, US | Germany = 27442<br>Italy = 6860<br>UK = 14363<br>US = 7530 | Labour income | Germany = 4,534<br>Italy = 1,516<br>UK = 4,989<br>US = 7,918 | Education, occupation and industry<br>$R^2$ Germany = 0.47<br>$R^2$ Italy = 0.34<br>$R^2$ UK = 0.31<br>$R^2$ US = 0.22 |
| Cervini-Pla (2011) | Spain | 2,836 sons<br><br>1,696 daughters | Annual log earnings of sons.<br><br>For daughters: log family income. | 5, 929 | Education (6 dummies)<br>Occupation (9 dummies).<br><br>$R^2$: 0.40 |

| | Country | Sample size (Main data) | Offspring' income | Sample size (Auxiliary) | Imputer variables and 1st stage $R^2$ |
|---|---|---|---|---|---|
| Dunn (2007) | Brazil | 14,872 | Annual log "earnings from all jobs". | 37,396 | Father's education (10 categories)<br><br>$R^2$: Not reported. |
| Ferreira and Veloso (2006) | Brazil | 25,927 | Log wages. | 59,340 | Father's education (7 dummies)<br>Father's occupation (6 dummies)<br><br>$R^2$: Not reported |
| Fortin and Lefebvre (1998) | Canada | Father – son:<br>3,400 (1986)<br>2,459 (1994)<br><br>Father-daughter:<br>2,474 (1986)<br>2.308 (1994) | Annual income | Circa 500,000 each year | Father's occupation (15 groups)<br><br>$R^2$: Not reported |
| Gong et al. (2012) | China | 5,475 | Annual log income. | Varies depending on UHIES sample. | Father's education; Father's occupation; Industry.<br><br>$R^2$: Not reported |
| Grawe (2004) | Ecuador, Nepal, Pakistan, and Peru | Ecuador: 1,461<br>Nepal: 229<br>Pakistan: 171<br>Peru: 98 | Total wage income | Ecuador: 685<br>Nepal: 239<br>Pakistan: 441<br>Peru: 166 | Father's education. |
| Lefranc et al. (2010) | France and Japan | Japan: 987<br><br>France 13,487 | Japan: Individual primary income (labor + assets) before tax or transfer.<br><br>France: Annual earnings from labor. | Fathers btw 25 and 54, in Japan.<br><br>Fathers btw 24 and 60 in France. | Linking variables: Japan: year of birth; 3 educational levels and occupation. R2: N.R.<br><br>France: year of birth; 6 levels of education. R2: N.R. |
| Lefranc (2011) | France | | Annual wages | | Father's education (6 |

| | | | | | |
|---|---|---|---|---|---|
| | | 29,415 | | 48,245 | groups).<br>Note: Offspring reports<br><br>$R^2$: Not reported |

| | **Country** | **Sample size (Main data)** | **Offspring' income** | **Sample size (Auxiliary)** | **Imputer variables and 1st stage $R^2$** |
|---|---|---|---|---|---|
| Lefranc and Trannoy (2005) | France and USA | 1977: 2,023<br>1985: 2,114<br>1993: 771 | Wages | 2,364 – 6,488 depending on the year. | Father's education (8 groups)<br>Father's occupation (7 groups)<br>Note: Offspring reported.<br>$R^2$: 0.49 - 0.54 |
| Lefranc et al. (2013) | Japan | 2,273 | Gross individual income | 7,170 | Father education (3 groups)<br>Father occupation (8 groups)<br>Firm size (2 groups)<br>Self-employment;<br>Residential area (3 groups).<br><br>$R^2$: 0.46 |
| Leigh (2007) | Australia | 1965: 946<br>1973: 1871<br>1987: 243<br>2004: 2115 | Hourly wages | 1965: 946<br>1973: 1871<br>1987: 243<br>2004: 2115 | Father's occupations (78 to 241 groups depending on survey).<br>Offspring reported.<br><br>$R^2$: Not reported |
| Murtazashvili et al (2013) | US and Sweden | US:467<br>Sweden: 324 | Annual earnings | US: 1,613<br>Sweden: 565 | Father's education<br>Father's occupation |
| Mocetti (2007) | Italy | 3,200 | Gross income from all sources but financial assets. | 4,903 | Father's education (5 groups; Work status (5 groups); employment sector (4 groups); geographical area (3 groups).<br><br>$R^2$: 0.30 |
| Nicoletti and Ermisch (2008) | UK | | 31-45 years old sons, with positive income (employed or self-employed) in at least | 896 | Father's occupation (4 groups)<br>Father's education |

| | | | | | |
|---|---|---|---|---|---|
| | | 8,832 | one wave of the panel | | (5 groups).<br><br>$R^2$: 0.31 |
| Nuñez and Miranda (2010) | Chile | 11,186 | 25 to 40 years old log earnings of sons working at least 30hs x week | 1987: 19,192<br>1990: 20,378 | Father's occupation (4 groups)<br>Father's education (5 groups).<br><br>$R^2$: 0.29 - 0.37. |

| | **Country** | **Sample size (Main data)** | **Offspring' income** | **Sample size (Auxiliary)** | **Imputer variables and 1st stage $R^2$** |
|---|---|---|---|---|---|
| Nuñez and Miranda (2011) | Chile (Greater Santiago) | 649 | Log income | 1,736 - 2,700 (depending on the year) | Father's education (3 groups)<br>Father's occupation (5 groups)<br><br>$R^2$: 0.48 – 0.66 |
| Piraino (2007) | Italy | 1,956 | Gross income from all sources bar financial assets. | 953 | Father's education (5 groups); work status (4 groups); employment sector (4 groups); geographical area (2 groups)<br><br>$R^2$ = 0.33. |
| Piraino (2014) | South Africa | 1,241 - 2,590 | Monthly gross employment earnings. | 1,355 | Education (5 groups)<br>Occupation (5 groups)<br><br>$R^2 \approx 0.40$ |
| Roccisano (2013) | Italy | 786 | Earnings | 3,203 | Education<br>Occupation<br>Industry<br><br>$R^2 \approx 0.20$ |
| Ueda (2009) | Japan | 1,114 married sons; | Gross annual earnings and income from all | | Father's years of education; |

| | | | | | |
|---|---|---|---|---|---|
| | | 906 single daughters;<br><br>1,390 married daughters | sources. | | Father's occupation and firm size (7 groups).<br><br>$R^2$: Not reported. |
| Ueda (2013) | Korea and Japan | Both countries: size varies depending on civil status of the sons and daughters | Annual earnings | Korea: Fathers btw 25 and 54<br>Japan: | Korea: education and occupation<br><br>Japan: parental income .<br><br>$R^2$:Not reported |
| Ueda and Sun (2013) | Taiwan | 745 | Annual income | 745 | Father's education (6 groups);<br>Father's occupation (11 groups).<br><br>$R^2$: Not reported. |

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## Appendix B. First-stage parameter estimates

**<u>Model M1a</u>. Time-average earnings as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.319 |
| | (0.00175) |
| Father_Race = 3, American Indian | -0.255 |
| | (0.00759) |
| Father_Race = 4, Asian | 0.0112 |
| | (0.00977) |
| Father_Race = 5, Pacific Islander | -0.275 |
| | (0.0211) |
| Father_Race = 7, Other / Unknown | 0.0560 |
| | (0.00304) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.534 |
| | (0.00645) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.734 |
| | (0.00604) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.861 |
| | (0.00589) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 1.010 |
| | (0.00591) |
| Father_Report_Father_Ed = 6, College degree | 1.316 |
| | (0.00607) |
| Father_Report_Father_Ed = 7, Advanced college degree | 1.431 |
| | (0.00601) |
| Constant | 9.939 |
| | (0.00585) |
| Observations | 500,000 |
| R-squared | 0.383 |

**<u>Model M1b</u>. Father's earnings in 1980 as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.303 |
| | (0.00270) |
| Father_Race = 3, American Indian | -0.298 |
| | (0.0115) |
| Father_Race = 4, Asian | 0.101 |
| | (0.0147) |
| Father_Race = 5, Pacific Islander | -0.241 |
| | (0.0317) |
| Father_Race = 7, Other / Unknown | 0.0846 |
| | (0.00467) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.613 |
| | (0.00982) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.744 |
| | (0.00932) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.985 |
| | (0.00913) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 1.170 |
| | (0.00918) |
| Father_Report_Father_Ed = 6, College degree | 1.361 |
| | (0.00940) |
| Father_Report_Father_Ed = 7, Advanced college degree | 1.356 |
| | (0.00929) |
| Father_Age6_Dummies = 1 | -0.693 |
| | (0.00440) |
| Father_Age6_Dummies = 2 | -0.415 |
| | (0.00375) |
| Father_Age6_Dummies = 3 | -0.227 |
| | (0.00361) |
| Father_Age6_Dummies = 4 | -0.0808 |
| | (0.00386) |
| Father_Age6_Dummies = 6 | 0.0111 |
| | (0.00397) |
| Father_Age6_Dummies = 7 | -0.0828 |
| | (0.00390) |
| Father_Age6_Dummies = 8 | 0.112 |
| | (0.00470) |
| Father_Age6_Dummies = 9 | -0.580 |
| | (0.00622) |
| Constant | 9.980 |
| | (0.00951) |

| | |
|---|---|
| Observations | 498,987 |
| R-squared | 0.250 |

**<u>Model M1c</u>. Time-average earnings as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.348 |
| | (0.00178) |
| Father_Race = 3, American Indian | -0.419 |
| | (0.00802) |
| Father_Race = 4, Asian | 0.103 |
| | (0.0100) |
| Father_Race = 5, Pacific Islander | -0.202 |
| | (0.0217) |
| Father_Race = 7, Other / Unknown | 0.0306 |
| | (0.00311) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.0249 |
| | (0.0103) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | 0.259 |
| | (0.00936) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.388 |
| | (0.00935) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.468 |
| | (0.00917) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.613 |
| | (0.00920) |
| Child_Report_Father_Ed = 6, College degree | 0.939 |
| | (0.00925) |
| Child_Report_Father_Ed = 7, Advanced college degree | 1.059 |
| | (0.00932) |
| Child_Report_Father_Ed = 10, 10 | 1.005 |
| | (0.0109) |
| Constant | 10.34 |
| | (0.00914) |
| Observations | 500,000 |
| R-squared | 0.352 |

**<u>Model M1d</u>. Father's earnings in 1980 as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.343 |
| | (0.00269) |
| Father_Race = 3, American Indian | -0.437 |
| | (0.0119) |
| Father_Race = 4, Asian | 0.129 |
| | (0.0148) |
| Father_Race = 5, Pacific Islander | -0.0721 |
| | (0.0320) |
| Father_Race = 7, Other / Unknown | 0.0674 |
| | (0.00468) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.205 |
| | (0.0153) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | 0.143 |
| | (0.0138) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.525 |
| | (0.0139) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.564 |
| | (0.0136) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.752 |
| | (0.0137) |
| Child_Report_Father_Ed = 6, College degree | 0.923 |
| | (0.0137) |
| Child_Report_Father_Ed = 7, Advanced college degree | 1.019 |
| | (0.0138) |
| Child_Report_Father_Ed = 10, 10 | 0.353 |
| | (0.0161) |
| Father_Age16_Dummies = 1 | -0.682 |
| | (0.00441) |
| Father_Age16_Dummies = 2 | -0.377 |
| | (0.00377) |
| Father_Age16_Dummies = 3 | -0.236 |
| | (0.00366) |
| Father_Age16_Dummies = 4 | -0.0905 |
| | (0.00388) |
| Father_Age16_Dummies = 6 | 0.0119 |
| | (0.00400) |
| Father_Age16_Dummies = 7 | -0.0721 |
| | (0.00394) |
| Father_Age16_Dummies = 8 | 0.0666 |
| | (0.00474) |
| Father_Age16_Dummies = 9 | -0.621 |

| | |
|---|---|
| | (0.00621) |
| Constant | 10.40 |
| | (0.0139) |
| Observations | 498,987 |
| R-squared | 0.242 |

**<u>Model M2a</u>. Time-average earnings as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.265 |
| | (0.00174) |
| Father_Race = 3, American Indian | -0.245 |
| | (0.00720) |
| Father_Race = 4, Asian | 0.0167 |
| | (0.00940) |
| Father_Race = 5, Pacific Islander | -0.220 |
| | (0.0201) |
| Father_Race = 7, Other / Unknown | 0.0485 |
| | (0.00291) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.360 |
| | (0.00620) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.516 |
| | (0.00586) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.627 |
| | (0.00570) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.715 |
| | (0.00576) |
| Father_Report_Father_Ed = 6, College degree | 1.016 |
| | (0.00591) |
| Father_Report_Father_Ed = 7, Advanced college degree | 1.056 |
| | (0.00595) |
| Father_Report_Class_Age_15 = 2, Managers and administrators | 0.00981 |
| | (0.00199) |
| Father_Report_Class_Age_15 = 3, Sales workers | -0.0210 |
| | (0.00314) |
| Father_Report_Class_Age_15 = 4, Clerical | -0.195 |
| | (0.00363) |
| Father_Report_Class_Age_15 = 5, Craftsmen | -0.113 |
| | (0.00225) |
| Father_Report_Class_Age_15 = 6, Operatives | -0.192 |
| | (0.00282) |
| Father_Report_Class_Age_15 = 7, Transport equipment | -0.212 |
| | (0.00289) |
| Father_Report_Class_Age_15 = 8, laborers | -0.319 |
| | (0.00368) |
| Father_Report_Class_Age_15 = 9, Farmers | -0.645 |
| | (0.00349) |
| Father_Report_Class_Age_15 = 10, Service workers | -0.235 |

| | |
|---|---|
| | (0.00304) |
| Father_Report_Class_Age_15 = 99, Unknown | -0.392 |
| | (0.00297) |
| Constant | 10.34 |
| | (0.00596) |
| Observations | 500,000 |
| R-squared | 0.447 |

**<u>Model M2b</u>. Father's earnings in 1980 as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.285 |
| | (0.00270) |
| Father_Race = 3, American Indian | -0.267 |
| | (0.0111) |
| Father_Race = 4, Asian | 0.132 |
| | (0.0143) |
| Father_Race = 5, Pacific Islander | -0.312 |
| | (0.0307) |
| Father_Race = 7, Other / Unknown | 0.0627 |
| | (0.00454) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.403 |
| | (0.00956) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.458 |
| | (0.00916) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.685 |
| | (0.00896) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.808 |
| | (0.00906) |
| Father_Report_Father_Ed = 6, College degree | 0.998 |
| | (0.00927) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.897 |
| | (0.00933) |
| Father_Report_Class_Age_15 = 2, Managers and administrators | 0.0557 |
| | (0.00304) |
| Father_Report_Class_Age_15 = 3, Sales workers | -0.120 |
| | (0.00479) |
| Father_Report_Class_Age_15 = 4, Clerical | -0.236 |
| | (0.00558) |
| Father_Report_Class_Age_15 = 5, Craftsmen | -0.120 |
| | (0.00344) |
| Father_Report_Class_Age_15 = 6, Operatives | -0.253 |
| | (0.00432) |
| Father_Report_Class_Age_15 = 7, Transport equipment | -0.0905 |
| | (0.00445) |
| Father_Report_Class_Age_15 = 8, laborers | -0.163 |
| | (0.00569) |
| Father_Report_Class_Age_15 = 9, Farmers | -0.853 |
| | (0.00533) |
| Father_Report_Class_Age_15 = 10, Service workers | -0.0983 |

| | |
|---|---|
| | (0.00465) |
| Father_Report_Class_Age_15 = 99, Unknown | -0.505 |
| | (0.00456) |
| Father_Age7_Dummies = 1 | -0.751 |
| | (0.00424) |
| Father_Age7_Dummies = 2 | -0.471 |
| | (0.00364) |
| Father_Age7_Dummies = 3 | -0.241 |
| | (0.00348) |
| Father_Age7_Dummies = 4 | -0.124 |
| | (0.00372) |
| Father_Age7_Dummies = 6 | -0.0415 |
| | (0.00385) |
| Father_Age7_Dummies = 7 | -0.133 |
| | (0.00377) |
| Father_Age7_Dummies = 8 | 0.0724 |
| | (0.00453) |
| Father_Age7_Dummies = 9 | -0.624 |
| | (0.00601) |
| Constant | 10.48 |
| | (0.00977) |
| Observations | 498,987 |
| R-squared | 0.311 |

**<u>Model M2c</u>. Time-average earnings as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.302 |
| | (0.00181) |
| Father_Race = 3, American Indian | -0.386 |
| | (0.00782) |
| Father_Race = 4, Asian | 0.0663 |
| | (0.00980) |
| Father_Race = 5, Pacific Islander | -0.190 |
| | (0.0211) |
| Father_Race = 7, Other / Unknown | 0.0402 |
| | (0.00317) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | -0.0698 |
| | (0.0101) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | 0.160 |
| | (0.00919) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.295 |
| | (0.00916) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.349 |
| | (0.00901) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.488 |
| | (0.00905) |
| Child_Report_Father_Ed = 6, College degree | 0.802 |
| | (0.00911) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.882 |
| | (0.00917) |
| Child_Report_Father_Ed = 10, 10 | 0.860 |
| | (0.0107) |
| Child_Report_Father_Class_1970 = 2, Managers and administrators | 0.00951 |
| | (0.00236) |
| Child_Report_Father_Class_1970 = 3, Sales workers | 0.0288 |
| | (0.00296) |
| Child_Report_Father_Class_1970 = 4, Clerical | 0.00381 |
| | (0.00404) |
| Child_Report_Father_Class_1970 = 5, Craftsmen | -0.108 |

| | |
|---|---|
| | (0.00220) |
| Child_Report_Father_Class_1970 = 6, Operatives | -0.107 |
| | (0.00256) |
| Child_Report_Father_Class_1970 = 7, Transport equipment | -0.0453 |
| | (0.00298) |
| Child_Report_Father_Class_1970 = 8, laborers | -0.190 |
| | (0.00310) |
| Child_Report_Father_Class_1970 = 9, Farmers | -0.294 |
| | (0.00293) |
| Child_Report_Father_Class_1970 = 10, Service workers | -0.115 |
| | (0.00335) |
| Constant | 10.54 |
| | (0.00916) |
| Observations | 490,850 |
| R-squared | 0.376 |

**<u>Model M2d</u>. Father's earnings in 1980 as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.302 |
| | (0.00277) |
| Father_Race = 3, American Indian | -0.431 |
| | (0.0119) |
| Father_Race = 4, Asian | 0.107 |
| | (0.0148) |
| Father_Race = 5, Pacific Islander | -0.0399 |
| | (0.0318) |
| Father_Race = 7, Other / Unknown | 0.0802 |
| | (0.00485) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.0987 |
| | (0.0153) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | 0.00605 |
| | (0.0139) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.407 |
| | (0.0139) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.417 |
| | (0.0137) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.585 |
| | (0.0137) |
| Child_Report_Father_Ed = 6, College degree | 0.763 |
| | (0.0138) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.821 |
| | (0.0139) |
| Child_Report_Father_Ed = 10, 10 | 0.192 |
| | (0.0161) |
| Child_Report_Father_Class_1970 = 2, Managers and administrators | 0.0532 |
| | (0.00356) |
| Child_Report_Father_Class_1970 = 3, Sales workers | -0.0391 |
| | (0.00448) |
| Child_Report_Father_Class_1970 = 4, Clerical | 0.0437 |

| | |
|---|---|
| | (0.00611) |
| Child_Report_Father_Class_1970 = 5, Craftsmen | -0.00744 |
| | (0.00334) |
| Child_Report_Father_Class_1970 = 6, Operatives | -0.0776 |
| | (0.00389) |
| Child_Report_Father_Class_1970 = 7, Transport equipment | 0.0551 |
| | (0.00450) |
| Child_Report_Father_Class_1970 = 8, laborers | -0.229 |
| | (0.00469) |
| Child_Report_Father_Class_1970 = 9, Farmers | -0.277 |
| | (0.00444) |
| Child_Report_Father_Class_1970 = 10, Service workers | -0.0380 |
| | (0.00507) |
| Father_Age17_Dummies = 1 | -0.676 |
| | (0.00443) |
| Father_Age17_Dummies = 2 | -0.355 |
| | (0.00379) |
| Father_Age17_Dummies = 3 | -0.228 |
| | (0.00367) |
| Father_Age17_Dummies = 4 | -0.0877 |
| | (0.00387) |
| Father_Age17_Dummies = 6 | 0.0219 |
| | (0.00402) |
| Father_Age17_Dummies = 7 | -0.0647 |
| | (0.00396) |
| Father_Age17_Dummies = 8 | 0.0991 |
| | (0.00481) |
| Father_Age17_Dummies = 9 | -0.643 |
| | (0.00633) |
| Constant | 10.58 |
| | (0.0142) |
| Observations | 489,837 |
| R-squared | 0.258 |

**<u>Model M3a</u>. Time-average earnings as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.238 |
| | (0.00171) |
| Father_Race = 3, American Indian | -0.294 |
| | (0.00704) |
| Father_Race = 4, Asian | 0.00442 |
| | (0.00914) |
| Father_Race = 5, Pacific Islander | -0.234 |
| | (0.0195) |
| Father_Race = 7, Other / Unknown | 0.0336 |
| | (0.00283) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.327 |
| | (0.00601) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.462 |
| | (0.00570) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.593 |
| | (0.00555) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.683 |
| | (0.00562) |
| Father_Report_Father_Ed = 6, College degree | 0.934 |
| | (0.00579) |
| Father_Report_Father_Ed = 7, Advanced college degree | 1.014 |
| | (0.00582) |

| | |
|---|---|
| Father_Report_Class_Age_15 = 2, Managers and administrators | 0.00333 |
| | (0.00203) |
| Father_Report_Class_Age_15 = 3, Sales workers | -0.0113 |
| | (0.00341) |
| Father_Report_Class_Age_15 = 4, Clerical | -0.207 |
| | (0.00364) |
| Father_Report_Class_Age_15 = 5, Craftsmen | -0.151 |
| | (0.00226) |
| Father_Report_Class_Age_15 = 6, Operatives | -0.264 |
| | (0.00287) |
| Father_Report_Class_Age_15 = 7, Transport equipment | -0.273 |
| | (0.00291) |
| Father_Report_Class_Age_15 = 8, laborers | -0.382 |
| | (0.00365) |
| Father_Report_Class_Age_15 = 9, Farmers | -0.683 |
| | (0.00769) |
| Father_Report_Class_Age_15 = 10, Service workers | -0.212 |
| | (0.00325) |
| Father_Report_Class_Age_15 = 99, Unknown | -0.0704 |
| | (0.00416) |
| Father_Report_INDUSTRY = 2, Mining | 0.0346 |
| | (0.00867) |
| Father_Report_INDUSTRY = 3, Construction | 0.0214 |
| | (0.00725) |
| Father_Report_INDUSTRY = 4, Manufacturing | 0.0592 |
| | (0.00708) |
| Father_Report_INDUSTRY = 5, Transport and communication | 0.0859 |
| | (0.00724) |
| Father_Report_INDUSTRY = 6, Wholesale and retail | -0.120 |
| | (0.00723) |
| Father_Report_INDUSTRY = 7, Finance | 0.0705 |
| | (0.00772) |
| Father_Report_INDUSTRY = 8, Business services | -0.276 |
| | (0.00768) |
| Father_Report_INDUSTRY = 9, Personal services | -0.171 |
| | (0.00875) |
| Father_Report_INDUSTRY = 10, Entertainment | 0.149 |
| | (0.0114) |
| Father_Report_INDUSTRY = 11, Professional services | -0.0713 |
| | (0.00723) |
| Father_Report_INDUSTRY = 12, Public administration | -0.0292 |
| | (0.00742) |
| Father_Report_INDUSTRY = 13, Unknown | -0.491 |
| | (0.00823) |
| Constant | 10.41 |
| | (0.00888) |
| Observations | 500,000 |
| R-squared | 0.481 |

**<u>Model M3b</u>. Father's earnings in 1980 as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.257 |
| | (0.00269) |
| Father_Race = 3, American Indian | -0.247 |
| | (0.0110) |
| Father_Race = 4, Asian | 0.123 |
| | (0.0142) |
| Father_Race = 5, Pacific Islander | -0.372 |
| | (0.0302) |
| Father_Race = 7, Other / Unknown | 0.0549 |
| | (0.00447) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.363 |
| | (0.00942) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.382 |
| | (0.00906) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.615 |
| | (0.00886) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.729 |
| | (0.00900) |
| Father_Report_Father_Ed = 6, College degree | 0.878 |
| | (0.00925) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.825 |

| | |
|---|---|
| | (0.00931) |
| Father_Report_Class_Age_15 = 2, Managers and administrators | 0.0399 |
| | (0.00316) |
| Father_Report_Class_Age_15 = 3, Sales workers | -0.141 |
| | (0.00529) |
| Father_Report_Class_Age_15 = 4, Clerical | -0.283 |
| | (0.00568) |
| Father_Report_Class_Age_15 = 5, Craftsmen | -0.165 |
| | (0.00351) |
| Father_Report_Class_Age_15 = 6, Operatives | -0.322 |
| | (0.00447) |
| Father_Report_Class_Age_15 = 7, Transport equipment | -0.180 |
| | (0.00456) |
| Father_Report_Class_Age_15 = 8, laborers | -0.219 |
| | (0.00572) |
| Father_Report_Class_Age_15 = 9, Farmers | -0.351 |
| | (0.0119) |
| Father_Report_Class_Age_15 = 10, Service workers | -0.101 |
| | (0.00504) |
| Father_Report_Class_Age_15 = 99, Unknown | -0.248 |
| | (0.00645) |
| Father_Report_INDUSTRY = 2, Mining | 0.630 |
| | (0.0136) |
| Father_Report_INDUSTRY = 3, Construction | 0.576 |
| | (0.0113) |
| Father_Report_INDUSTRY = 4, Manufacturing | 0.588 |
| | (0.0110) |
| Father_Report_INDUSTRY = 5, Transport and communication | 0.703 |
| | (0.0112) |
| Father_Report_INDUSTRY = 6, Wholesale and retail | 0.454 |
| | (0.0112) |
| Father_Report_INDUSTRY = 7, Finance | 0.674 |
| | (0.0120) |
| Father_Report_INDUSTRY = 8, Business services | 0.279 |
| | (0.0119) |
| Father_Report_INDUSTRY = 9, Personal services | 0.244 |
| | (0.0136) |
| Father_Report_INDUSTRY = 10, Entertainment | 0.887 |
| | (0.0177) |
| Father_Report_INDUSTRY = 11, Professional services | 0.465 |
| | (0.0112) |
| Father_Report_INDUSTRY = 12, Public administration | 0.571 |
| | (0.0115) |
| Father_Report_INDUSTRY = 13, Unknown | 0.134 |
| | (0.0128) |
| Father_Age8_Dummies = 1 | -0.715 |
| | (0.00420) |
| Father_Age8_Dummies = 2 | -0.446 |
| | (0.00362) |
| Father_Age8_Dummies = 3 | -0.216 |
| | (0.00348) |
| Father_Age8_Dummies = 4 | -0.123 |
| | (0.00370) |
| Father_Age8_Dummies = 6 | -0.0289 |
| | (0.00381) |
| Father_Age8_Dummies = 7 | -0.113 |
| | (0.00376) |
| Father_Age8_Dummies = 8 | 0.0664 |
| | (0.00450) |
| Father_Age8_Dummies = 9 | -0.620 |

| | |
|---|---|
| | (0.00596) |
| Constant | 10.03 |
| | (0.0143) |
| Observations | 498,987 |
| R-squared | 0.335 |

**<u>Model M3c</u>. Time-average earnings as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (se) |
|---|---|
| Father_Race = 2, Black | -0.313 |
| | (0.00176) |
| Father_Race = 3, American Indian | -0.333 |
| | (0.00758) |
| Father_Race = 4, Asian | 0.0589 |
| | (0.00947) |
| Father_Race = 5, Pacific Islander | -0.286 |
| | (0.0204) |
| Father_Race = 7, Other / Unknown | 0.00331 |
| | (0.00307) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | -0.129 |
| | (0.00975) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | 0.0571 |
| | (0.00889) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.141 |
| | (0.00889) |

| | |
|---|---|
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.238 |
| | (0.00874) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.357 |
| | (0.00880) |
| Child_Report_Father_Ed = 6, College degree | 0.670 |
| | (0.00887) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.791 |
| | (0.00898) |
| Child_Report_Father_Ed = 10, 10 | 0.732 |
| | (0.0104) |
| Child_Report_Father_Class_1970 = 2, Managers and administrators | -0.00893 |
| | (0.00229) |
| Child_Report_Father_Class_1970 = 3, Sales workers | 0.0129 |
| | (0.00290) |
| Child_Report_Father_Class_1970 = 4, Clerical | -0.00322 |
| | (0.00395) |
| Child_Report_Father_Class_1970 = 5, Craftsmen | -0.116 |
| | (0.00214) |
| Child_Report_Father_Class_1970 = 6, Operatives | -0.131 |
| | (0.00251) |
| Child_Report_Father_Class_1970 = 7, Transport equipment | -0.0981 |
| | (0.00292) |
| Child_Report_Father_Class_1970 = 8, laborers | -0.204 |
| | (0.00301) |
| Child_Report_Father_Class_1970 = 9, Farmers | -0.153 |
| | (0.00298) |
| Child_Report_Father_Class_1970 = 10, Service workers | -0.116 |
| | (0.00327) |
| Child_Report_INDUSTRY = 2, Mining | 0.476 |
| | (0.00560) |
| Child_Report_INDUSTRY = 3, Construction | 0.317 |
| | (0.00295) |
| Child_Report_INDUSTRY = 4, Manufacturing | 0.436 |
| | (0.00260) |
| Child_Report_INDUSTRY = 5, Transport and communication | 0.465 |
| | (0.00303) |
| Child_Report_INDUSTRY = 6, Wholesale and retail | 0.349 |
| | (0.00293) |
| Child_Report_INDUSTRY = 7, Finance | 0.374 |
| | (0.00399) |
| Child_Report_INDUSTRY = 8, Business services | 0.181 |
| | (0.00361) |
| Child_Report_INDUSTRY = 9, Personal services | 0.263 |
| | (0.00676) |
| Child_Report_INDUSTRY = 10, Entertainment | 0.242 |
| | (0.00879) |
| Child_Report_INDUSTRY = 11, Professional services | 0.285 |
| | (0.00320) |
| Child_Report_INDUSTRY = 12, Public administration | 0.314 |
| | (0.00310) |
| Constant | 10.32 |
| | (0.00897) |
| Observations | 490,850 |
| R-squared | 0.420 |

**<u>Model M3d</u>. Father's earnings in 1980 as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.319 |
| | (0.00271) |
| Father_Race = 3, American Indian | -0.358 |
| | (0.0116) |
| Father_Race = 4, Asian | 0.0936 |
| | (0.0144) |
| Father_Race = 5, Pacific Islander | -0.142 |
| | (0.0309) |

| | |
|---|---|
| Father_Race = 7, Other / Unknown | 0.0238 |
| | (0.00474) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.0228 |
| | (0.0149) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | -0.150 |
| | (0.0135) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.178 |
| | (0.0136) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.234 |
| | (0.0133) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.361 |
| | (0.0134) |
| Child_Report_Father_Ed = 6, College degree | 0.557 |
| | (0.0135) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.650 |
| | (0.0137) |
| Child_Report_Father_Ed = 10, 10 | 0.0210 |
| | (0.0158) |
| Child_Report_Father_Class_1970 = 2, Managers and administrators | 0.0374 |
| | (0.00348) |
| Child_Report_Father_Class_1970 = 3, Sales workers | -0.0483 |
| | (0.00440) |
| Child_Report_Father_Class_1970 = 4, Clerical | 0.00692 |
| | (0.00600) |
| Child_Report_Father_Class_1970 = 5, Craftsmen | -0.0258 |
| | (0.00327) |
| Child_Report_Father_Class_1970 = 6, Operatives | -0.0969 |
| | (0.00385) |
| Child_Report_Father_Class_1970 = 7, Transport equipment | -0.00843 |
| | (0.00445) |
| Child_Report_Father_Class_1970 = 8, laborers | -0.255 |
| | (0.00458) |
| Child_Report_Father_Class_1970 = 9, Farmers | -0.0789 |
| | (0.00455) |
| Child_Report_Father_Class_1970 = 10, Service workers | -0.0748 |
| | (0.00498) |
| Child_Report_INDUSTRY = 2, Mining | 0.699 |
| | (0.00878) |
| Child_Report_INDUSTRY = 3, Construction | 0.511 |
| | (0.00450) |
| Child_Report_INDUSTRY = 4, Manufacturing | 0.594 |
| | (0.00395) |
| Child_Report_INDUSTRY = 5, Transport and communication | 0.682 |
| | (0.00462) |
| Child_Report_INDUSTRY = 6, Wholesale and retail | 0.530 |
| | (0.00446) |
| Child_Report_INDUSTRY = 7, Finance | 0.487 |
| | (0.00608) |
| Child_Report_INDUSTRY = 8, Business services | 0.365 |
| | (0.00549) |
| Child_Report_INDUSTRY = 9, Personal services | 0.159 |
| | (0.0103) |
| Child_Report_INDUSTRY = 10, Entertainment | 0.502 |
| | (0.0133) |
| Child_Report_INDUSTRY = 11, Professional services | 0.433 |
| | (0.00487) |
| Child_Report_INDUSTRY = 12, Public administration | 0.579 |
| | (0.00471) |
| Father_Age18_Dummies = 1 | -0.677 |
| | (0.00433) |

| | |
|---|---|
| Father_Age18_Dummies = 2 | -0.353 |
| | (0.00371) |
| Father_Age18_Dummies = 3 | -0.241 |
| | (0.00360) |
| Father_Age18_Dummies = 4 | -0.0977 |
| | (0.00379) |
| Father_Age18_Dummies = 6 | -0.00825 |
| | (0.00393) |
| Father_Age18_Dummies = 7 | -0.0903 |
| | (0.00389) |
| Father_Age18_Dummies = 8 | 0.0943 |
| | (0.00470) |
| Father_Age18_Dummies = 9 | -0.595 |
| | (0.00618) |
| Constant | 10.28 |
| | (0.0140) |
| Observations | 489,837 |
| R-squared | 0.301 |

**<u>Model M4a</u>. Time-average earnings as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.176 |
| | (0.00165) |
| Father_Race = 3, American Indian | -0.262 |

| | |
|---|---|
| | (0.00600) |
| Father_Race = 4, Asian | -0.201 |
| | (0.0109) |
| Father_Race = 5, Pacific Islander | 0.131 |
| | (0.0172) |
| Father_Race = 7, Other / Unknown | 0.0284 |
| | (0.00264) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.278 |
| | (0.00544) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.351 |
| | (0.00516) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.483 |
| | (0.00511) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.545 |
| | (0.00519) |
| Father_Report_Father_Ed = 6, College degree | 0.772 |
| | (0.00534) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.872 |
| | (0.00543) |
| Father_Report_Occ_Age_15 = 1 | 0.550 |
| | (0.00728) |
| Father_Report_Occ_Age_15 = 2 | 0.491 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 3 | 0.213 |
| | (0.0105) |
| Father_Report_Occ_Age_15 = 4 | 0.408 |
| | (0.00881) |
| Father_Report_Occ_Age_15 = 5 | 0.774 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 6 | 0.569 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 10 | 0.679 |
| | (0.00960) |
| Father_Report_Occ_Age_15 = 11 | 0.580 |
| | (0.00872) |
| Father_Report_Occ_Age_15 = 12 | 0.543 |
| | (0.00794) |
| Father_Report_Occ_Age_15 = 13 | 0.486 |
| | (0.00758) |
| Father_Report_Occ_Age_15 = 14 | 0.598 |
| | (0.00715) |
| Father_Report_Occ_Age_15 = 22 | 0.189 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 25 | 0.0827 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 30 | 0.719 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 31 | 1.060 |
| | (0.00884) |
| Father_Report_Occ_Age_15 = 44 | 0.737 |
| | (0.0157) |
| Father_Report_Occ_Age_15 = 45 | 0.0674 |
| | (0.0168) |
| Father_Report_Occ_Age_15 = 54 | 0.493 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 55 | 0.535 |
| | (0.0106) |
| Father_Report_Occ_Age_15 = 56 | 0.441 |
| | (0.00768) |
| Father_Report_Occ_Age_15 = 62 | 0.334 |

| | |
|---|---|
| | (0.0122) |
| Father_Report_Occ_Age_15 = 63 | 0.568 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 64 | 0.369 |
| | (0.00902) |
| Father_Report_Occ_Age_15 = 65 | 1.587 |
| | (0.00827) |
| Father_Report_Occ_Age_15 = 72 | 0.621 |
| | (0.0177) |
| Father_Report_Occ_Age_15 = 75 | 0.472 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 80 | 0.219 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 83 | 0.487 |
| | (0.0160) |
| Father_Report_Occ_Age_15 = 85 | -0.614 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 86 | -0.105 |
| | (0.00811) |
| Father_Report_Occ_Age_15 = 91 | 0.511 |
| | (0.0156) |
| Father_Report_Occ_Age_15 = 93 | 0.296 |
| | (0.0193) |
| Father_Report_Occ_Age_15 = 100 | 0.0950 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 111 | 0.612 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 112 | 0.471 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 115 | -0.146 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 123 | 0.291 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 142 | -0.00561 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 144 | 0.104 |
| | (0.00746) |
| Father_Report_Occ_Age_15 = 152 | 0.463 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 153 | 0.443 |
| | (0.00903) |
| Father_Report_Occ_Age_15 = 155 | 0.966 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 162 | 0.661 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 163 | 0.0490 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 171 | 0.271 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 173 | 0.0502 |
| | (0.0105) |
| Father_Report_Occ_Age_15 = 174 | 0.0783 |
| | (0.00889) |
| Father_Report_Occ_Age_15 = 183 | 0.601 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 184 | 1.376 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 185 | 0.817 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 190 | 0.522 |

| | |
|---|---|
| | (0.0122) |
| Father_Report_Occ_Age_15 = 191 | 0.0753 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 192 | 0.457 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 194 | 0.410 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 195 | 0.646 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 202 | 0.199 |
| | (0.00827) |
| Father_Report_Occ_Age_15 = 205 | 0.702 |
| | (0.0167) |
| Father_Report_Occ_Age_15 = 210 | 0.258 |
| | (0.0128) |
| Father_Report_Occ_Age_15 = 212 | 0.449 |
| | (0.00984) |
| Father_Report_Occ_Age_15 = 213 | 0.246 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 215 | 0.470 |
| | (0.0169) |
| Father_Report_Occ_Age_15 = 216 | 0.0511 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 220 | 0.428 |
| | (0.00970) |
| Father_Report_Occ_Age_15 = 222 | 0.214 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 223 | 0.188 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 225 | 0.344 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 226 | 0.727 |
| | (0.0127) |
| Father_Report_Occ_Age_15 = 230 | 1.239 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 231 | 0.552 |
| | (0.00800) |
| Father_Report_Occ_Age_15 = 233 | 0.722 |
| | (0.00889) |
| Father_Report_Occ_Age_15 = 235 | 0.682 |
| | (0.00979) |
| Father_Report_Occ_Age_15 = 240 | 0.271 |
| | (0.00824) |
| Father_Report_Occ_Age_15 = 245 | 0.512 |
| | (0.00625) |
| Father_Report_Occ_Age_15 = 260 | -0.416 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 265 | 0.440 |
| | (0.00852) |
| Father_Report_Occ_Age_15 = 270 | 0.318 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 271 | 0.506 |
| | (0.0111) |
| Father_Report_Occ_Age_15 = 281 | 0.543 |
| | (0.00920) |
| Father_Report_Occ_Age_15 = 282 | 0.606 |
| | (0.00730) |
| Father_Report_Occ_Age_15 = 283 | 0.526 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 284 | 0.298 |

| | |
|---|---|
| | (0.00876) |
| Father_Report_Occ_Age_15 = 285 | 0.468 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 303 | 0.0606 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 305 | 0.355 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 312 | 0.456 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 321 | -0.0784 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 323 | 0.336 |
| | (0.0111) |
| Father_Report_Occ_Age_15 = 331 | 0.352 |
| | (0.00851) |
| Father_Report_Occ_Age_15 = 334 | 0.468 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 343 | 0.833 |
| | (0.0112) |
| Father_Report_Occ_Age_15 = 374 | 0.173 |
| | (0.00860) |
| Father_Report_Occ_Age_15 = 381 | 0.0772 |
| | (0.00838) |
| Father_Report_Occ_Age_15 = 394 | 0.210 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 405 | 0.644 |
| | (0.0156) |
| Father_Report_Occ_Age_15 = 410 | -0.0537 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 412 | -0.258 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 413 | -0.353 |
| | (0.0168) |
| Father_Report_Occ_Age_15 = 415 | 0.211 |
| | (0.00753) |
| Father_Report_Occ_Age_15 = 420 | 0.395 |
| | (0.0156) |
| Father_Report_Occ_Age_15 = 421 | 0.449 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 424 | 0.0705 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 426 | 0.194 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 430 | 0.538 |
| | (0.00755) |
| Father_Report_Occ_Age_15 = 433 | 0.715 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 436 | 0.187 |
| | (0.00796) |
| Father_Report_Occ_Age_15 = 441 | 0.430 |
| | (0.00671) |
| Father_Report_Occ_Age_15 = 452 | -0.0471 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 454 | 0.0495 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 461 | 0.216 |
| | (0.00794) |
| Father_Report_Occ_Age_15 = 462 | -0.404 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 470 | 0.393 |

| | |
|---|---|
| | (0.00954) |
| Father_Report_Occ_Age_15 = 471 | 0.540 |
| | (0.00830) |
| Father_Report_Occ_Age_15 = 473 | 0.0749 |
| | (0.00713) |
| Father_Report_Occ_Age_15 = 474 | 0.168 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 481 | 0.180 |
| | (0.00674) |
| Father_Report_Occ_Age_15 = 482 | 0.550 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 483 | 0.0417 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 484 | 0.421 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 492 | 0.148 |
| | (0.00870) |
| Father_Report_Occ_Age_15 = 495 | 0.510 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 502 | 0.627 |
| | (0.00864) |
| Father_Report_Occ_Age_15 = 510 | 0.247 |
| | (0.00858) |
| Father_Report_Occ_Age_15 = 522 | 0.391 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 525 | 0.556 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 530 | 0.573 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 534 | -0.797 |
| | (0.0160) |
| Father_Report_Occ_Age_15 = 535 | -0.171 |
| | (0.0160) |
| Father_Report_Occ_Age_15 = 540 | 0.473 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 545 | 0.498 |
| | (0.0105) |
| Father_Report_Occ_Age_15 = 550 | 0.723 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 552 | 0.465 |
| | (0.00850) |
| Father_Report_Occ_Age_15 = 561 | 0.341 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 600 | 0.513 |
| | (0.00790) |
| Father_Report_Occ_Age_15 = 602 | 0.0786 |
| | (0.00791) |
| Father_Report_Occ_Age_15 = 610 | 0.198 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 611 | 0.254 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 612 | -0.876 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 614 | -0.237 |
| | (0.0169) |
| Father_Report_Occ_Age_15 = 621 | 0.204 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 623 | 0.316 |
| | (0.0109) |
| Father_Report_Occ_Age_15 = 631 | 0.443 |

| | |
|---|---|
| | (0.00872) |
| Father_Report_Occ_Age_15 = 633 | 0.561 |
| | (0.00990) |
| Father_Report_Occ_Age_15 = 635 | 0.127 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 640 | -0.0837 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 641 | 0.0856 |
| | (0.00902) |
| Father_Report_Occ_Age_15 = 642 | 0.208 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 643 | 0.242 |
| | (0.00826) |
| Father_Report_Occ_Age_15 = 644 | 0.0754 |
| | (0.0170) |
| Father_Report_Occ_Age_15 = 650 | 0.0907 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 651 | 0.202 |
| | (0.0158) |
| Father_Report_Occ_Age_15 = 652 | 0.192 |
| | (0.0105) |
| Father_Report_Occ_Age_15 = 653 | 0.573 |
| | (0.0154) |
| Father_Report_Occ_Age_15 = 662 | 0.327 |
| | (0.0155) |
| Father_Report_Occ_Age_15 = 664 | -0.412 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 666 | 0.162 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 673 | 0.0316 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 674 | -0.304 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 680 | 0.0744 |
| | (0.00900) |
| Father_Report_Occ_Age_15 = 690 | 0.191 |
| | (0.00790) |
| Father_Report_Occ_Age_15 = 692 | 0.130 |
| | (0.0104) |
| Father_Report_Occ_Age_15 = 694 | 0.152 |
| | (0.00867) |
| Father_Report_Occ_Age_15 = 695 | 0.272 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 703 | -0.186 |
| | (0.00918) |
| Father_Report_Occ_Age_15 = 705 | 0.168 |
| | (0.00747) |
| Father_Report_Occ_Age_15 = 706 | 0.209 |
| | (0.00796) |
| Father_Report_Occ_Age_15 = 710 | 0.286 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 715 | 0.227 |
| | (0.00649) |
| Father_Report_Occ_Age_15 = 740 | 0.269 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 750 | -0.215 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 751 | 0.304 |
| | (0.00826) |
| Father_Report_Occ_Age_15 = 753 | 0.221 |

| | |
|---|---|
| | (0.00768) |
| Father_Report_Occ_Age_15 = 755 | -0.116 |
| | (0.0116) |
| Father_Report_Occ_Age_15 = 761 | -0.456 |
| | (0.00813) |
| Father_Report_Occ_Age_15 = 762 | -0.0939 |
| | (0.0118) |
| Father_Report_Occ_Age_15 = 770 | 0.365 |
| | (0.0122) |
| Father_Report_Occ_Age_15 = 780 | 0.301 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 801 | -0.143 |
| | (0.00970) |
| Father_Report_Occ_Age_15 = 822 | -0.536 |
| | (0.0106) |
| Father_Report_Occ_Age_15 = 824 | -0.643 |
| | (0.0179) |
| Father_Report_Occ_Age_15 = 902 | 0.138 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 903 | -0.0113 |
| | (0.00674) |
| Father_Report_Occ_Age_15 = 910 | 0.170 |
| | (0.0109) |
| Father_Report_Occ_Age_15 = 912 | 0.511 |
| | (0.0170) |
| Father_Report_Occ_Age_15 = 925 | -0.325 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 926 | 0.418 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 932, omitted | - |
| Father_Report_Occ_Age_15 = 950 | 0.494 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 961 | 0.437 |
| | (0.00877) |
| Father_Report_Occ_Age_15 = 962 | 0.0739 |
| | (0.00841) |
| Father_Report_Occ_Age_15 = 964 | 0.528 |
| | (0.00765) |
| Father_Report_Occ_Age_15 = 999 | 0.510 |
| | (0.00911) |
| Father_Report_INDUSTRY = 2, Mining | 0.199 |
| | (0.00924) |
| Father_Report_INDUSTRY = 3, Construction | 0.0238 |
| | (0.00744) |
| Father_Report_INDUSTRY = 4, Manufacturing | 0.0620 |
| | (0.00718) |
| Father_Report_INDUSTRY = 5, Transport and communication | 0.0754 |
| | (0.00736) |
| Father_Report_INDUSTRY = 6, Wholesale and retail | -0.160 |
| | (0.00735) |
| Father_Report_INDUSTRY = 7, Finance | 0.140 |
| | (0.00811) |
| Father_Report_INDUSTRY = 8, Business services | -0.196 |
| | (0.00802) |
| Father_Report_INDUSTRY = 9, Personal services | -0.163 |
| | (0.00867) |
| Father_Report_INDUSTRY = 10, Entertainment | -0.0892 |
| | (0.0130) |
| Father_Report_INDUSTRY = 11, Professional services | 0.00443 |

| | |
|---|---|
| | (0.00757) |
| Father_Report_INDUSTRY = 12, Public administration | -0.142 |
| | (0.00760) |
| Father_Report_INDUSTRY = 13, Unknown | -0.185 |
| | (0.00910) |
| Constant | 10.06 |
| | (0.0103) |
| Observations | 500,000 |
| R-squared | 0.656 |

**<u>Model M4b</u>. Father's earnings in 1980 as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.164 |
| | (0.00272) |
| Father_Race = 3, American Indian | -0.376 |
| | (0.00991) |
| Father_Race = 4, Asian | -0.420 |
| | (0.0180) |
| Father_Race = 5, Pacific Islander | 0.351 |
| | (0.0281) |
| Father_Race = 7, Other / Unknown | 0.0607 |
| | (0.00441) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.249 |
| | (0.00902) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.197 |
| | (0.00867) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.408 |
| | (0.00866) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.455 |
| | (0.00882) |
| Father_Report_Father_Ed = 6, College degree | 0.561 |
| | (0.00906) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.566 |
| | (0.00923) |
| Father_Report_Occ_Age_15 = 1 | 1.002 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 2 | 0.972 |
| | (0.0203) |
| Father_Report_Occ_Age_15 = 3 | 0.557 |
| | (0.0173) |
| Father_Report_Occ_Age_15 = 4 | 0.891 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 5 | 1.006 |
| | (0.0206) |
| Father_Report_Occ_Age_15 = 6 | 0.797 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 10 | 1.075 |
| | (0.0157) |
| Father_Report_Occ_Age_15 = 11 | 1.388 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 12 | 0.917 |
| | (0.0130) |
| Father_Report_Occ_Age_15 = 13 | 1.079 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 14 | 1.181 |
| | (0.0118) |
| Father_Report_Occ_Age_15 = 22 | 0.652 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 25 | 0.534 |
| | (0.0197) |
| Father_Report_Occ_Age_15 = 30 | 0.587 |
| | (0.0270) |
| Father_Report_Occ_Age_15 = 31 | 0.844 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 44 | 1.003 |
| | (0.0258) |
| Father_Report_Occ_Age_15 = 45 | 1.186 |
| | (0.0278) |
| Father_Report_Occ_Age_15 = 54 | 0.835 |
| | (0.0270) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 55 | 0.606 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 56 | 0.692 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 62 | 0.869 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 63 | 1.038 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 64 | 1.055 |
| | (0.0148) |
| Father_Report_Occ_Age_15 = 65 | 1.245 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 72 | -3.018 |
| | (0.0291) |
| Father_Report_Occ_Age_15 = 75 | 0.950 |
| | (0.0200) |
| Father_Report_Occ_Age_15 = 80 | 0.615 |
| | (0.0195) |
| Father_Report_Occ_Age_15 = 83 | 0.159 |
| | (0.0263) |
| Father_Report_Occ_Age_15 = 85 | 0.731 |
| | (0.0268) |
| Father_Report_Occ_Age_15 = 86 | 0.741 |
| | (0.0134) |
| Father_Report_Occ_Age_15 = 91 | 0.387 |
| | (0.0255) |
| Father_Report_Occ_Age_15 = 93 | 1.369 |
| | (0.0318) |
| Father_Report_Occ_Age_15 = 100 | 0.736 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 111 | 1.964 |
| | (0.0269) |
| Father_Report_Occ_Age_15 = 112 | 0.856 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 115 | 0.486 |
| | (0.0266) |
| Father_Report_Occ_Age_15 = 123 | 1.074 |
| | (0.0204) |
| Father_Report_Occ_Age_15 = 142 | 0.557 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 144 | 0.544 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 152 | 0.631 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 153 | 0.899 |
| | (0.0148) |
| Father_Report_Occ_Age_15 = 155 | 1.236 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 162 | 1.076 |
| | (0.0269) |
| Father_Report_Occ_Age_15 = 163 | 0.943 |
| | (0.0260) |
| Father_Report_Occ_Age_15 = 171 | 0.743 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 173 | 1.013 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 174 | 0.617 |
| | (0.0146) |
| Father_Report_Occ_Age_15 = 183 | 1.006 |
| | (0.0198) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 184 | 1.941 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 185 | 1.080 |
| | (0.0268) |
| Father_Report_Occ_Age_15 = 190 | 1.145 |
| | (0.0200) |
| Father_Report_Occ_Age_15 = 191 | 0.393 |
| | (0.0271) |
| Father_Report_Occ_Age_15 = 192 | 0.905 |
| | (0.0267) |
| Father_Report_Occ_Age_15 = 194 | 0.530 |
| | (0.0264) |
| Father_Report_Occ_Age_15 = 195 | 1.166 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 202 | 0.447 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 205 | 1.571 |
| | (0.0277) |
| Father_Report_Occ_Age_15 = 210 | 0.754 |
| | (0.0209) |
| Father_Report_Occ_Age_15 = 212 | 0.756 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 213 | 0.0442 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 215 | 1.002 |
| | (0.0276) |
| Father_Report_Occ_Age_15 = 216 | 0.344 |
| | (0.0199) |
| Father_Report_Occ_Age_15 = 220 | 0.726 |
| | (0.0160) |
| Father_Report_Occ_Age_15 = 222 | 0.837 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 223 | 0.791 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 225 | 0.697 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 226 | 1.240 |
| | (0.0208) |
| Father_Report_Occ_Age_15 = 230 | 1.427 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 231 | 1.160 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 233 | 1.054 |
| | (0.0146) |
| Father_Report_Occ_Age_15 = 235 | 1.356 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 240 | 0.938 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 245 | 0.967 |
| | (0.0102) |
| Father_Report_Occ_Age_15 = 260 | 0.279 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 265 | 1.147 |
| | (0.0140) |
| Father_Report_Occ_Age_15 = 270 | 0.890 |
| | (0.0206) |
| Father_Report_Occ_Age_15 = 271 | 0.254 |
| | (0.0182) |
| Father_Report_Occ_Age_15 = 281 | 1.057 |
| | (0.0151) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 282 | 0.901 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 283 | 1.149 |
| | (0.0176) |
| Father_Report_Occ_Age_15 = 284 | -0.296 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 285 | 0.728 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 303 | 1.333 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 305 | 0.436 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 312 | 2.161 |
| | (0.0268) |
| Father_Report_Occ_Age_15 = 321 | 1.130 |
| | (0.0269) |
| Father_Report_Occ_Age_15 = 323 | 0.632 |
| | (0.0182) |
| Father_Report_Occ_Age_15 = 331 | 0.516 |
| | (0.0140) |
| Father_Report_Occ_Age_15 = 334 | 1.096 |
| | (0.0261) |
| Father_Report_Occ_Age_15 = 343 | 1.160 |
| | (0.0185) |
| Father_Report_Occ_Age_15 = 374 | 0.293 |
| | (0.0141) |
| Father_Report_Occ_Age_15 = 381 | 0.00862 |
| | (0.0138) |
| Father_Report_Occ_Age_15 = 394 | 0.666 |
| | (0.0176) |
| Father_Report_Occ_Age_15 = 405 | 0.593 |
| | (0.0258) |
| Father_Report_Occ_Age_15 = 410 | 0.388 |
| | (0.0199) |
| Father_Report_Occ_Age_15 = 412 | 0.310 |
| | (0.0213) |
| Father_Report_Occ_Age_15 = 413 | 0.582 |
| | (0.0275) |
| Father_Report_Occ_Age_15 = 415 | 0.859 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 420 | 0.797 |
| | (0.0256) |
| Father_Report_Occ_Age_15 = 421 | 1.420 |
| | (0.0268) |
| Father_Report_Occ_Age_15 = 424 | -0.222 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 426 | 0.438 |
| | (0.0200) |
| Father_Report_Occ_Age_15 = 430 | 1.025 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 433 | 0.967 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 436 | 0.586 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 441 | 0.747 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 452 | 0.650 |
| | (0.0197) |
| Father_Report_Occ_Age_15 = 454 | 0.433 |
| | (0.0269) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 461 | 0.602 |
| | (0.0130) |
| Father_Report_Occ_Age_15 = 462 | 0.454 |
| | (0.0267) |
| Father_Report_Occ_Age_15 = 470 | 0.819 |
| | (0.0156) |
| Father_Report_Occ_Age_15 = 471 | 1.053 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 473 | 0.371 |
| | (0.0117) |
| Father_Report_Occ_Age_15 = 474 | 0.653 |
| | (0.0271) |
| Father_Report_Occ_Age_15 = 481 | 0.514 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 482 | 0.880 |
| | (0.0263) |
| Father_Report_Occ_Age_15 = 483 | 0.0963 |
| | (0.0266) |
| Father_Report_Occ_Age_15 = 484 | 0.734 |
| | (0.0203) |
| Father_Report_Occ_Age_15 = 492 | 0.227 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 495 | 0.770 |
| | (0.0260) |
| Father_Report_Occ_Age_15 = 502 | 1.156 |
| | (0.0141) |
| Father_Report_Occ_Age_15 = 510 | 0.748 |
| | (0.0141) |
| Father_Report_Occ_Age_15 = 522 | 0.333 |
| | (0.0260) |
| Father_Report_Occ_Age_15 = 525 | 0.964 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 530 | 0.713 |
| | (0.0268) |
| Father_Report_Occ_Age_15 = 534 | -0.829 |
| | (0.0262) |
| Father_Report_Occ_Age_15 = 535 | 0.209 |
| | (0.0262) |
| Father_Report_Occ_Age_15 = 540 | 1.003 |
| | (0.0260) |
| Father_Report_Occ_Age_15 = 545 | 0.825 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 550 | 1.355 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 552 | 0.962 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 561 | -0.230 |
| | (0.0272) |
| Father_Report_Occ_Age_15 = 600 | 0.510 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 602 | 0.736 |
| | (0.0130) |
| Father_Report_Occ_Age_15 = 610 | 0.679 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 611 | -0.0179 |
| | (0.0260) |
| Father_Report_Occ_Age_15 = 612 | -0.925 |
| | (0.0271) |
| Father_Report_Occ_Age_15 = 614 | 0.243 |
| | (0.0277) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 621 | 0.506 |
| | (0.0265) |
| Father_Report_Occ_Age_15 = 623 | 0.877 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 631 | 0.655 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 633 | 0.949 |
| | (0.0162) |
| Father_Report_Occ_Age_15 = 635 | -2.214 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 640 | 0.0990 |
| | (0.0218) |
| Father_Report_Occ_Age_15 = 641 | 0.470 |
| | (0.0149) |
| Father_Report_Occ_Age_15 = 642 | 0.773 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 643 | 0.434 |
| | (0.0135) |
| Father_Report_Occ_Age_15 = 644 | 0.702 |
| | (0.0279) |
| Father_Report_Occ_Age_15 = 650 | 0.578 |
| | (0.0270) |
| Father_Report_Occ_Age_15 = 651 | 0.933 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 652 | 0.672 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 653 | 1.731 |
| | (0.0256) |
| Father_Report_Occ_Age_15 = 662 | 0.794 |
| | (0.0254) |
| Father_Report_Occ_Age_15 = 664 | -0.230 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 666 | -0.815 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 673 | 0.397 |
| | (0.0270) |
| Father_Report_Occ_Age_15 = 674 | -0.532 |
| | (0.0267) |
| Father_Report_Occ_Age_15 = 680 | 0.524 |
| | (0.0148) |
| Father_Report_Occ_Age_15 = 690 | 0.623 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 692 | -0.519 |
| | (0.0171) |
| Father_Report_Occ_Age_15 = 694 | 0.518 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 695 | 0.619 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 703 | 0.391 |
| | (0.0151) |
| Father_Report_Occ_Age_15 = 705 | 0.709 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 706 | 0.674 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 710 | 1.425 |
| | (0.0263) |
| Father_Report_Occ_Age_15 = 715 | 0.614 |
| | (0.0107) |
| Father_Report_Occ_Age_15 = 740 | 0.674 |
| | (0.0265) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 751 | 0.742 |
| | (0.0135) |
| Father_Report_Occ_Age_15 = 753 | 0.633 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 755 | 0.0120 |
| | (0.0190) |
| Father_Report_Occ_Age_15 = 761 | 0.233 |
| | (0.0134) |
| Father_Report_Occ_Age_15 = 762 | 0.858 |
| | (0.0194) |
| Father_Report_Occ_Age_15 = 770 | 0.482 |
| | (0.0200) |
| Father_Report_Occ_Age_15 = 780 | 0.761 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 801 | -0.177 |
| | (0.0159) |
| Father_Report_Occ_Age_15 = 822 | -0.606 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 824 | 0.270 |
| | (0.0294) |
| Father_Report_Occ_Age_15 = 902 | 0.278 |
| | (0.0177) |
| Father_Report_Occ_Age_15 = 903 | 0.513 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 910 | 0.839 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 912 | 2.077 |
| | (0.0279) |
| Father_Report_Occ_Age_15 = 925 | 0.617 |
| | (0.0202) |
| Father_Report_Occ_Age_15 = 926 | 0.951 |
| | (0.0199) |
| Father_Report_Occ_Age_15 = 932, omitted | - |
| Father_Report_Occ_Age_15 = 950 | 0.694 |
| | (0.0267) |
| Father_Report_Occ_Age_15 = 961 | 0.714 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 962 | 0.523 |
| | (0.0138) |
| Father_Report_Occ_Age_15 = 964 | 0.731 |
| | (0.0125) |
| Father_Report_Occ_Age_15 = 999 | -0.593 |
| | (0.0150) |
| Father_Report_INDUSTRY = 2, Mining | -0.0277 |
| | (0.0152) |
| Father_Report_INDUSTRY = 3, Construction | -0.254 |
| | (0.0123) |
| Father_Report_INDUSTRY = 4, Manufacturing | -0.134 |
| | (0.0118) |
| Father_Report_INDUSTRY = 5, Transport and communication | -0.0734 |
| | (0.0122) |
| Father_Report_INDUSTRY = 6, Wholesale and retail | -0.309 |
| | (0.0121) |
| Father_Report_INDUSTRY = 7, Finance | -0.0864 |
| | (0.0134) |
| Father_Report_INDUSTRY = 8, Business services | -0.382 |
| | (0.0132) |
| Father_Report_INDUSTRY = 9, Personal services | -0.646 |
| | (0.0143) |

| | |
|---|---|
| Father_Report_INDUSTRY = 10, Entertainment | 0.0233 |
| | (0.0213) |
| Father_Report_INDUSTRY = 11, Professional services | -0.239 |
| | (0.0125) |
| Father_Report_INDUSTRY = 12, Public administration | -0.0821 |
| | (0.0125) |
| Father_Report_INDUSTRY = 13, Unknown | -0.109 |
| | (0.0150) |
| Father_Age9_Dummies = 1 | -0.689 |
| | (0.00421) |
| Father_Age9_Dummies = 2 | -0.421 |
| | (0.00349) |
| Father_Age9_Dummies = 3 | -0.158 |
| | (0.00339) |
| Father_Age9_Dummies = 4 | -0.110 |
| | (0.00367) |
| Father_Age9_Dummies = 6 | 0.00894 |
| | (0.00373) |
| Father_Age9_Dummies = 7 | -0.197 |
| | (0.00362) |
| Father_Age9_Dummies = 8 | 0.0992 |
| | (0.00431) |
| Father_Age9_Dummies = 9 | -0.827 |
| | (0.00607) |
| Constant | 10.13 |
| | (0.0172) |
| Observations | 498,987 |
| R-squared | 0.506 |

**<u>Model M4c</u>. Time-average earnings as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.285 |
| | (0.00175) |
| Father_Race = 3, American Indian | -0.368 |
| | (0.00740) |
| Father_Race = 4, Asian | 0.00176 |
| | (0.0119) |
| Father_Race = 5, Pacific Islander | -0.0936 |
| | (0.0195) |
| Father_Race = 7, Other / Unknown | 0.0357 |
| | (0.00299) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | -0.210 |
| | (0.00963) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | -0.0432 |
| | (0.00881) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.0260 |
| | (0.00882) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.111 |
| | (0.00865) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.215 |
| | (0.00871) |
| Child_Report_Father_Ed = 6, College degree | 0.553 |
| | (0.00879) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.699 |
| | (0.00888) |
| Child_Report_Father_Ed = 10, 10 | 0.685 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 2 | 0.408 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 3 | -0.229 |
| | (0.0103) |
| Child_Report_Father_Occ_1970 = 4 | -0.00641 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 5 | -0.123 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 6 | -0.185 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 10 | -0.202 |
| | (0.00906) |
| Child_Report_Father_Occ_1970 = 11 | 0.0282 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 12 | 0.0102 |
| | (0.00778) |
| Child_Report_Father_Occ_1970 = 13 | -0.0528 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 14 | 0.00927 |
| | (0.00672) |
| Child_Report_Father_Occ_1970 = 23 | 0.146 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 24 | 0.498 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 31 | 0.163 |
| | (0.00698) |
| Child_Report_Father_Occ_1970 = 45 | 0.0644 |

| | |
|---|---|
| | (0.0112) |
| Child_Report_Father_Occ_1970 = 53 | 0.0555 |
| | (0.0136) |
| Child_Report_Father_Occ_1970 = 55 | -0.426 |
| | (0.0187) |
| Child_Report_Father_Occ_1970 = 56 | -0.0649 |
| | (0.00889) |
| Child_Report_Father_Occ_1970 = 62 | -0.0633 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 64 | 0.556 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 65 | -0.0567 |
| | (0.00724) |
| Child_Report_Father_Occ_1970 = 80 | -0.486 |
| | (0.0177) |
| Child_Report_Father_Occ_1970 = 85 | -0.250 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 86 | -0.178 |
| | (0.00712) |
| Child_Report_Father_Occ_1970 = 93 | 0.0854 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 100 | 0.385 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 111 | 0.370 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 112 | -0.0426 |
| | (0.0185) |
| Child_Report_Father_Occ_1970 = 123 | 0.903 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 126 | -0.149 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 140 | 0.244 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 142 | -0.0272 |
| | (0.0129) |
| Child_Report_Father_Occ_1970 = 144 | 0.0740 |
| | (0.00782) |
| Child_Report_Father_Occ_1970 = 145 | 0.0249 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 150 | -0.157 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 152 | 0.0222 |
| | (0.00928) |
| Child_Report_Father_Occ_1970 = 153 | 0.0845 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 163 | 0.494 |
| | (0.0183) |
| Child_Report_Father_Occ_1970 = 174 | -0.565 |
| | (0.0189) |
| Child_Report_Father_Occ_1970 = 183 | 0.485 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 184 | -0.550 |
| | (0.0191) |
| Child_Report_Father_Occ_1970 = 185 | 0.543 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 190 | 0.0557 |
| | (0.0185) |
| Child_Report_Father_Occ_1970 = 191 | -0.442 |
| | (0.0192) |
| Child_Report_Father_Occ_1970 = 192 | -0.313 |

| | |
|---|---|
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 195 | -0.439 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 202 | -0.0741 |
| | (0.00667) |
| Child_Report_Father_Occ_1970 = 203 | 0.356 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 211 | -0.0305 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 212 | -0.377 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 215 | -0.183 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 220 | -0.217 |
| | (0.0107) |
| Child_Report_Father_Occ_1970 = 222 | -0.00134 |
| | (0.00976) |
| Child_Report_Father_Occ_1970 = 225 | -0.139 |
| | (0.0100) |
| Child_Report_Father_Occ_1970 = 226 | 0.374 |
| | (0.0185) |
| Child_Report_Father_Occ_1970 = 230 | -0.143 |
| | (0.00981) |
| Child_Report_Father_Occ_1970 = 233 | 0.105 |
| | (0.00972) |
| Child_Report_Father_Occ_1970 = 235 | 0.321 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 240 | 0.0840 |
| | (0.00778) |
| Child_Report_Father_Occ_1970 = 245 | -0.00816 |
| | (0.00446) |
| Child_Report_Father_Occ_1970 = 265 | -0.220 |
| | (0.00644) |
| Child_Report_Father_Occ_1970 = 270 | 0.0773 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 281 | 0.255 |
| | (0.00739) |
| Child_Report_Father_Occ_1970 = 282 | 0.0766 |
| | (0.00579) |
| Child_Report_Father_Occ_1970 = 283 | -0.00455 |
| | (0.00635) |
| Child_Report_Father_Occ_1970 = 284 | 0.0261 |
| | (0.00715) |
| Child_Report_Father_Occ_1970 = 285 | 0.0354 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 301 | -0.0884 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 305 | 0.383 |
| | (0.0191) |
| Child_Report_Father_Occ_1970 = 310 | -0.0700 |
| | (0.0177) |
| Child_Report_Father_Occ_1970 = 312 | -0.203 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 321 | 0.386 |
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 326 | -0.168 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 331 | -0.179 |
| | (0.00719) |
| Child_Report_Father_Occ_1970 = 332 | 0.119 |

| | |
|---|---|
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 333 | 0.522 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 343 | 0.146 |
| | (0.0211) |
| Child_Report_Father_Occ_1970 = 361 | 0.0330 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 363 | -0.0432 |
| | (0.0177) |
| Child_Report_Father_Occ_1970 = 374 | -0.00730 |
| | (0.00978) |
| Child_Report_Father_Occ_1970 = 381 | 0.103 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 390 | 0.0701 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 410 | -0.359 |
| | (0.00847) |
| Child_Report_Father_Occ_1970 = 412 | -0.486 |
| | (0.00987) |
| Child_Report_Father_Occ_1970 = 413 | 0.154 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 415 | -0.111 |
| | (0.00543) |
| Child_Report_Father_Occ_1970 = 420 | -0.751 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 422 | 0.565 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 424 | 0.0910 |
| | (0.00965) |
| Child_Report_Father_Occ_1970 = 426 | 0.256 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 430 | -0.202 |
| | (0.00749) |
| Child_Report_Father_Occ_1970 = 433 | 0.196 |
| | (0.00836) |
| Child_Report_Father_Occ_1970 = 436 | -0.519 |
| | (0.00966) |
| Child_Report_Father_Occ_1970 = 441 | -0.0873 |
| | (0.00562) |
| Child_Report_Father_Occ_1970 = 452 | 0.228 |
| | (0.0171) |
| Child_Report_Father_Occ_1970 = 454 | -0.271 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 455 | -0.230 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 461 | -0.223 |
| | (0.00640) |
| Child_Report_Father_Occ_1970 = 470 | 0.0730 |
| | (0.00984) |
| Child_Report_Father_Occ_1970 = 471 | -0.155 |
| | (0.0128) |
| Child_Report_Father_Occ_1970 = 472 | -0.0874 |
| | (0.0127) |
| Child_Report_Father_Occ_1970 = 473 | -0.168 |
| | (0.00541) |
| Child_Report_Father_Occ_1970 = 475 | 0.132 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 480 | -1.377 |
| | (0.0129) |
| Child_Report_Father_Occ_1970 = 481 | 0.138 |

| | |
|---|---|
| | (0.0113) |
| Child_Report_Father_Occ_1970 = 482 | 0.0399 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 483 | 0.340 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 484 | -0.340 |
| | (0.0187) |
| Child_Report_Father_Occ_1970 = 485 | 0.0764 |
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 492 | -0.699 |
| | (0.0175) |
| Child_Report_Father_Occ_1970 = 495 | -0.378 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 502 | -0.0558 |
| | (0.00881) |
| Child_Report_Father_Occ_1970 = 510 | -0.458 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 516 | -0.283 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 522 | -0.216 |
| | (0.00755) |
| Child_Report_Father_Occ_1970 = 530 | -0.0606 |
| | (0.00974) |
| Child_Report_Father_Occ_1970 = 534 | -0.344 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 535 | -0.292 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 540 | 0.466 |
| | (0.0177) |
| Child_Report_Father_Occ_1970 = 542 | 0.884 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 545 | -0.423 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 551 | -0.354 |
| | (0.00993) |
| Child_Report_Father_Occ_1970 = 554 | 0.384 |
| | (0.0137) |
| Child_Report_Father_Occ_1970 = 561 | 0.340 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 563 | -0.0746 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 575 | -0.378 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 600 | -0.0628 |
| | (0.00489) |
| Child_Report_Father_Occ_1970 = 602 | -0.0196 |
| | (0.00629) |
| Child_Report_Father_Occ_1970 = 604 | -0.293 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 610 | -0.106 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 611 | 0.184 |
| | (0.0150) |
| Child_Report_Father_Occ_1970 = 614 | -0.558 |
| | (0.0187) |
| Child_Report_Father_Occ_1970 = 615 | 0.478 |
| | (0.0129) |
| Child_Report_Father_Occ_1970 = 622 | -0.0863 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 623 | -0.349 |

| | |
|---|---|
| | (0.0183) |
| Child_Report_Father_Occ_1970 = 630 | 0.0641 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 631 | -0.130 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 633 | -0.0397 |
| | (0.00889) |
| Child_Report_Father_Occ_1970 = 640 | -0.124 |
| | (0.00704) |
| Child_Report_Father_Occ_1970 = 642 | 0.219 |
| | (0.0172) |
| Child_Report_Father_Occ_1970 = 643 | -0.703 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 644 | 0.267 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 645 | 0.164 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 653 | -0.0698 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 662 | -0.275 |
| | (0.0136) |
| Child_Report_Father_Occ_1970 = 666 | -0.501 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 673 | -0.266 |
| | (0.0198) |
| Child_Report_Father_Occ_1970 = 674 | 0.699 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 680 | -0.343 |
| | (0.00672) |
| Child_Report_Father_Occ_1970 = 690 | -0.245 |
| | (0.00782) |
| Child_Report_Father_Occ_1970 = 692 | -0.234 |
| | (0.00747) |
| Child_Report_Father_Occ_1970 = 694 | -0.154 |
| | (0.00823) |
| Child_Report_Father_Occ_1970 = 695 | -0.169 |
| | (0.00525) |
| Child_Report_Father_Occ_1970 = 703 | -0.399 |
| | (0.00785) |
| Child_Report_Father_Occ_1970 = 705 | -0.0978 |
| | (0.00711) |
| Child_Report_Father_Occ_1970 = 706 | -0.253 |
| | (0.00963) |
| Child_Report_Father_Occ_1970 = 714 | 0.357 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 715 | -0.0626 |
| | (0.00485) |
| Child_Report_Father_Occ_1970 = 751 | -0.0983 |
| | (0.00569) |
| Child_Report_Father_Occ_1970 = 752 | -0.162 |
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 753 | -0.247 |
| | (0.00789) |
| Child_Report_Father_Occ_1970 = 755 | -0.525 |
| | (0.00791) |
| Child_Report_Father_Occ_1970 = 760 | -1.147 |
| | (0.0189) |
| Child_Report_Father_Occ_1970 = 761 | -0.394 |
| | (0.00711) |
| Child_Report_Father_Occ_1970 = 762 | -0.556 |

| | |
|---|---|
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 763 | -0.154 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 770 | -0.376 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 780 | -0.189 |
| | (0.00719) |
| Child_Report_Father_Occ_1970 = 785 | 0.00855 |
| | (0.00726) |
| Child_Report_Father_Occ_1970 = 801 | -0.122 |
| | (0.00483) |
| Child_Report_Father_Occ_1970 = 802 | -0.0199 |
| | (0.0183) |
| Child_Report_Father_Occ_1970 = 821 | -0.108 |
| | (0.0187) |
| Child_Report_Father_Occ_1970 = 822 | -0.340 |
| | (0.00670) |
| Child_Report_Father_Occ_1970 = 902 | -0.218 |
| | (0.0178) |
| Child_Report_Father_Occ_1970 = 903 | -0.232 |
| | (0.00627) |
| Child_Report_Father_Occ_1970 = 910 | -0.120 |
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 912 | 0.00815 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 925 | -0.123 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 961 | 0.0308 |
| | (0.00725) |
| Child_Report_Father_Occ_1970 = 962 | -0.165 |
| | (0.00711) |
| Child_Report_Father_Occ_1970 = 964 | -0.0634 |
| | (0.00688) |
| Child_Report_INDUSTRY = 2, Mining | 0.522 |
| | (0.00578) |
| Child_Report_INDUSTRY = 3, Construction | 0.335 |
| | (0.00300) |
| Child_Report_INDUSTRY = 4, Manufacturing | 0.449 |
| | (0.00261) |
| Child_Report_INDUSTRY = 5, Transport and communication | 0.453 |
| | (0.00306) |
| Child_Report_INDUSTRY = 6, Wholesale and retail | 0.352 |
| | (0.00291) |
| Child_Report_INDUSTRY = 7, Finance | 0.421 |
| | (0.00433) |
| Child_Report_INDUSTRY = 8, Business services | 0.224 |
| | (0.00362) |
| Child_Report_INDUSTRY = 9, Personal services | 0.315 |
| | (0.00745) |
| Child_Report_INDUSTRY = 10, Entertainment | -0.0135 |
| | (0.00929) |
| Child_Report_INDUSTRY = 11, Professional services | 0.290 |
| | (0.00318) |
| Child_Report_INDUSTRY = 12, Public administration | 0.338 |
| | (0.00314) |
| Constant | 10.43 |
| | (0.00966) |
| Observations | 500,000 |
| R-squared | 0.517 |

**<u>Model M4d</u>. Father's earnings in 1980 as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.310 |
| | (0.00265) |
| Father_Race = 3, American Indian | -0.405 |
| | (0.0111) |
| Father_Race = 4, Asian | -0.160 |
| | (0.0177) |
| Father_Race = 5, Pacific Islander | 0.0838 |
| | (0.0290) |
| Father_Race = 7, Other / Unknown | 0.0285 |
| | (0.00455) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.0766 |
| | (0.0145) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | -0.0933 |
| | (0.0131) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.158 |
| | (0.0132) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.198 |
| | (0.0129) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.343 |
| | (0.0131) |
| Child_Report_Father_Ed = 6, College degree | 0.535 |
| | (0.0132) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.643 |
| | (0.0133) |
| Child_Report_Father_Ed = 10, 10 | 0.158 |
| | (0.0156) |
| Child_Report_Father_Occ_1970 = 2 | 0.639 |
| | (0.0265) |
| Child_Report_Father_Occ_1970 = 3 | 0.0564 |
| | (0.0153) |
| Child_Report_Father_Occ_1970 = 4 | 0.178 |
| | (0.0162) |
| Child_Report_Father_Occ_1970 = 5 | -0.330 |
| | (0.0162) |
| Child_Report_Father_Occ_1970 = 6 | -0.217 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 10 | -0.296 |
| | (0.0135) |
| Child_Report_Father_Occ_1970 = 11 | -0.155 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 12 | -0.344 |
| | (0.0116) |
| Child_Report_Father_Occ_1970 = 13 | 0.127 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 14 | 0.0694 |
| | (0.0100) |
| Child_Report_Father_Occ_1970 = 23 | 0.259 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 24 | 0.933 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 31 | 0.289 |

| | |
|---|---|
| | (0.0104) |
| Child_Report_Father_Occ_1970 = 45 | 0.308 |
| | (0.0167) |
| Child_Report_Father_Occ_1970 = 53 | 0.263 |
| | (0.0202) |
| Child_Report_Father_Occ_1970 = 55 | -1.994 |
| | (0.0278) |
| Child_Report_Father_Occ_1970 = 56 | -0.0678 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 62 | -0.0154 |
| | (0.0162) |
| Child_Report_Father_Occ_1970 = 64 | 0.606 |
| | (0.0271) |
| Child_Report_Father_Occ_1970 = 65 | -0.442 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 80 | -0.439 |
| | (0.0264) |
| Child_Report_Father_Occ_1970 = 85 | 0.239 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 86 | 0.0563 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 93 | 0.296 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 100 | 0.437 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 111 | 0.139 |
| | (0.0272) |
| Child_Report_Father_Occ_1970 = 112 | 0.00516 |
| | (0.0276) |
| Child_Report_Father_Occ_1970 = 123 | 0.833 |
| | (0.0275) |
| Child_Report_Father_Occ_1970 = 126 | 0.000270 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 140 | 0.0857 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 142 | -0.116 |
| | (0.0193) |
| Child_Report_Father_Occ_1970 = 144 | 0.210 |
| | (0.0117) |
| Child_Report_Father_Occ_1970 = 145 | -0.0775 |
| | (0.0271) |
| Child_Report_Father_Occ_1970 = 150 | 0.0459 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 152 | -0.951 |
| | (0.0139) |
| Child_Report_Father_Occ_1970 = 153 | 0.0778 |
| | (0.0198) |
| Child_Report_Father_Occ_1970 = 163 | 0.878 |
| | (0.0273) |
| Child_Report_Father_Occ_1970 = 174 | 0.232 |
| | (0.0281) |
| Child_Report_Father_Occ_1970 = 183 | 0.325 |
| | (0.0198) |
| Child_Report_Father_Occ_1970 = 184 | 0.0821 |
| | (0.0286) |
| Child_Report_Father_Occ_1970 = 185 | 0.409 |
| | (0.0293) |
| Child_Report_Father_Occ_1970 = 190 | 0.387 |
| | (0.0274) |
| Child_Report_Father_Occ_1970 = 191 | -0.395 |

| | |
|---|---|
| | (0.0285) |
| Child_Report_Father_Occ_1970 = 192 | -0.251 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 195 | 0.0663 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 202 | -0.0216 |
| | (0.00993) |
| Child_Report_Father_Occ_1970 = 203 | 0.460 |
| | (0.0262) |
| Child_Report_Father_Occ_1970 = 211 | -0.196 |
| | (0.0194) |
| Child_Report_Father_Occ_1970 = 212 | -0.328 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 215 | 0.142 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 220 | -0.679 |
| | (0.0159) |
| Child_Report_Father_Occ_1970 = 222 | 0.168 |
| | (0.0145) |
| Child_Report_Father_Occ_1970 = 225 | 0.00739 |
| | (0.0149) |
| Child_Report_Father_Occ_1970 = 226 | 0.489 |
| | (0.0274) |
| Child_Report_Father_Occ_1970 = 230 | 0.0133 |
| | (0.0146) |
| Child_Report_Father_Occ_1970 = 233 | 0.323 |
| | (0.0145) |
| Child_Report_Father_Occ_1970 = 235 | 0.416 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 240 | 0.188 |
| | (0.0116) |
| Child_Report_Father_Occ_1970 = 245 | 0.0248 |
| | (0.00666) |
| Child_Report_Father_Occ_1970 = 265 | -0.0640 |
| | (0.00960) |
| Child_Report_Father_Occ_1970 = 270 | 0.340 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 281 | -0.0990 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 282 | -0.0535 |
| | (0.00863) |
| Child_Report_Father_Occ_1970 = 283 | -0.0834 |
| | (0.00948) |
| Child_Report_Father_Occ_1970 = 284 | -0.120 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 285 | 0.000662 |
| | (0.0194) |
| Child_Report_Father_Occ_1970 = 301 | 0.0827 |
| | (0.0276) |
| Child_Report_Father_Occ_1970 = 305 | 0.157 |
| | (0.0285) |
| Child_Report_Father_Occ_1970 = 310 | -0.0932 |
| | (0.0263) |
| Child_Report_Father_Occ_1970 = 312 | -0.119 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 321 | 0.615 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 326 | -0.119 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 331 | -0.0881 |

| | |
|---|---|
| | (0.0107) |
| Child_Report_Father_Occ_1970 = 332 | -0.284 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 333 | 0.323 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 343 | 0.305 |
| | (0.0313) |
| Child_Report_Father_Occ_1970 = 361 | 0.259 |
| | (0.0193) |
| Child_Report_Father_Occ_1970 = 363 | 0.00823 |
| | (0.0263) |
| Child_Report_Father_Occ_1970 = 374 | -0.0473 |
| | (0.0146) |
| Child_Report_Father_Occ_1970 = 381 | -0.110 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 390 | -0.148 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 410 | -0.819 |
| | (0.0126) |
| Child_Report_Father_Occ_1970 = 412 | -0.620 |
| | (0.0148) |
| Child_Report_Father_Occ_1970 = 413 | 0.657 |
| | (0.0262) |
| Child_Report_Father_Occ_1970 = 415 | 0.0225 |
| | (0.00811) |
| Child_Report_Father_Occ_1970 = 420 | -0.586 |
| | (0.0269) |
| Child_Report_Father_Occ_1970 = 422 | 0.418 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 424 | 0.365 |
| | (0.0144) |
| Child_Report_Father_Occ_1970 = 426 | 0.428 |
| | (0.0196) |
| Child_Report_Father_Occ_1970 = 430 | 0.119 |
| | (0.0112) |
| Child_Report_Father_Occ_1970 = 433 | 0.241 |
| | (0.0124) |
| Child_Report_Father_Occ_1970 = 436 | -0.486 |
| | (0.0144) |
| Child_Report_Father_Occ_1970 = 441 | -0.294 |
| | (0.00838) |
| Child_Report_Father_Occ_1970 = 452 | 0.233 |
| | (0.0255) |
| Child_Report_Father_Occ_1970 = 454 | -0.228 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 455 | 0.0933 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 461 | -0.0228 |
| | (0.00957) |
| Child_Report_Father_Occ_1970 = 470 | 0.108 |
| | (0.0147) |
| Child_Report_Father_Occ_1970 = 471 | 0.264 |
| | (0.0191) |
| Child_Report_Father_Occ_1970 = 472 | 0.185 |
| | (0.0190) |
| Child_Report_Father_Occ_1970 = 473 | 0.0438 |
| | (0.00816) |
| Child_Report_Father_Occ_1970 = 475 | -0.0162 |
| | (0.0277) |
| Child_Report_Father_Occ_1970 = 480 | -1.372 |

| | |
|---|---|
| | (0.0193) |
| Child_Report_Father_Occ_1970 = 481 | -0.0808 |
| | (0.0169) |
| Child_Report_Father_Occ_1970 = 482 | -0.0239 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 483 | 0.419 |
| | (0.0262) |
| Child_Report_Father_Occ_1970 = 484 | -0.165 |
| | (0.0279) |
| Child_Report_Father_Occ_1970 = 485 | -0.252 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 492 | -1.165 |
| | (0.0260) |
| Child_Report_Father_Occ_1970 = 495 | -0.517 |
| | (0.0262) |
| Child_Report_Father_Occ_1970 = 502 | 0.228 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 510 | -0.201 |
| | (0.0200) |
| Child_Report_Father_Occ_1970 = 516 | -0.224 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 522 | 0.0215 |
| | (0.0113) |
| Child_Report_Father_Occ_1970 = 530 | -0.664 |
| | (0.0145) |
| Child_Report_Father_Occ_1970 = 534 | -0.334 |
| | (0.0198) |
| Child_Report_Father_Occ_1970 = 535 | 0.211 |
| | (0.0272) |
| Child_Report_Father_Occ_1970 = 540 | 0.195 |
| | (0.0264) |
| Child_Report_Father_Occ_1970 = 542 | 1.032 |
| | (0.0277) |
| Child_Report_Father_Occ_1970 = 545 | 0.113 |
| | (0.0194) |
| Child_Report_Father_Occ_1970 = 551 | 0.153 |
| | (0.0148) |
| Child_Report_Father_Occ_1970 = 554 | 0.517 |
| | (0.0205) |
| Child_Report_Father_Occ_1970 = 561 | 0.353 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 563 | -0.0388 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 575 | -0.0526 |
| | (0.0277) |
| Child_Report_Father_Occ_1970 = 600 | 0.0476 |
| | (0.00728) |
| Child_Report_Father_Occ_1970 = 602 | 0.126 |
| | (0.00936) |
| Child_Report_Father_Occ_1970 = 604 | -0.422 |
| | (0.0277) |
| Child_Report_Father_Occ_1970 = 610 | -0.190 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 611 | 0.620 |
| | (0.0223) |
| Child_Report_Father_Occ_1970 = 614 | -0.392 |
| | (0.0278) |
| Child_Report_Father_Occ_1970 = 615 | 0.500 |
| | (0.0193) |
| Child_Report_Father_Occ_1970 = 622 | -0.119 |

| | |
|---|---|
| | (0.0271) |
| Child_Report_Father_Occ_1970 = 623 | -0.297 |
| | (0.0272) |
| Child_Report_Father_Occ_1970 = 630 | -0.811 |
| | (0.0271) |
| Child_Report_Father_Occ_1970 = 631 | 0.103 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 633 | 0.311 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 640 | 0.0320 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 642 | 0.247 |
| | (0.0256) |
| Child_Report_Father_Occ_1970 = 643 | -0.304 |
| | (0.0268) |
| Child_Report_Father_Occ_1970 = 644 | 0.385 |
| | (0.0196) |
| Child_Report_Father_Occ_1970 = 645 | 0.123 |
| | (0.0276) |
| Child_Report_Father_Occ_1970 = 653 | -0.144 |
| | (0.0268) |
| Child_Report_Father_Occ_1970 = 662 | -0.122 |
| | (0.0202) |
| Child_Report_Father_Occ_1970 = 666 | -2.710 |
| | (0.0273) |
| Child_Report_Father_Occ_1970 = 673 | -0.0197 |
| | (0.0296) |
| Child_Report_Father_Occ_1970 = 674 | 0.755 |
| | (0.0270) |
| Child_Report_Father_Occ_1970 = 680 | -0.433 |
| | (0.0100) |
| Child_Report_Father_Occ_1970 = 690 | -0.224 |
| | (0.0116) |
| Child_Report_Father_Occ_1970 = 692 | -0.463 |
| | (0.0111) |
| Child_Report_Father_Occ_1970 = 694 | -0.141 |
| | (0.0123) |
| Child_Report_Father_Occ_1970 = 695 | -0.126 |
| | (0.00784) |
| Child_Report_Father_Occ_1970 = 703 | -0.216 |
| | (0.0117) |
| Child_Report_Father_Occ_1970 = 705 | 0.0738 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 706 | -0.214 |
| | (0.0143) |
| Child_Report_Father_Occ_1970 = 714 | 0.230 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 715 | -0.00633 |
| | (0.00723) |
| Child_Report_Father_Occ_1970 = 751 | -0.0965 |
| | (0.00849) |
| Child_Report_Father_Occ_1970 = 752 | -0.315 |
| | (0.0266) |
| Child_Report_Father_Occ_1970 = 753 | -0.142 |
| | (0.0118) |
| Child_Report_Father_Occ_1970 = 755 | -1.433 |
| | (0.0118) |
| Child_Report_Father_Occ_1970 = 760 | -1.374 |
| | (0.0283) |
| Child_Report_Father_Occ_1970 = 761 | -0.328 |

| | |
|---|---|
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 762 | -0.353 |
| | (0.0272) |
| Child_Report_Father_Occ_1970 = 763 | -0.104 |
| | (0.0196) |
| Child_Report_Father_Occ_1970 = 770 | -0.330 |
| | (0.0274) |
| Child_Report_Father_Occ_1970 = 780 | -0.0443 |
| | (0.0107) |
| Child_Report_Father_Occ_1970 = 785 | -0.00318 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 801 | -0.0600 |
| | (0.00720) |
| Child_Report_Father_Occ_1970 = 802 | -0.127 |
| | (0.0272) |
| Child_Report_Father_Occ_1970 = 821 | -0.140 |
| | (0.0279) |
| Child_Report_Father_Occ_1970 = 822 | -0.128 |
| | (0.00998) |
| Child_Report_Father_Occ_1970 = 902 | -0.321 |
| | (0.0265) |
| Child_Report_Father_Occ_1970 = 903 | -0.138 |
| | (0.00933) |
| Child_Report_Father_Occ_1970 = 910 | 0.152 |
| | (0.0266) |
| Child_Report_Father_Occ_1970 = 912 | 0.367 |
| | (0.0271) |
| Child_Report_Father_Occ_1970 = 925 | -0.101 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 961 | 0.136 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 962 | -0.540 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 964 | 0.102 |
| | (0.0103) |
| Child_Report_INDUSTRY = 2, Mining | 0.745 |
| | (0.00901) |
| Child_Report_INDUSTRY = 3, Construction | 0.565 |
| | (0.00449) |
| Child_Report_INDUSTRY = 4, Manufacturing | 0.650 |
| | (0.00390) |
| Child_Report_INDUSTRY = 5, Transport and communication | 0.709 |
| | (0.00458) |
| Child_Report_INDUSTRY = 6, Wholesale and retail | 0.555 |
| | (0.00436) |
| Child_Report_INDUSTRY = 7, Finance | 0.586 |
| | (0.00647) |
| Child_Report_INDUSTRY = 8, Business services | 0.404 |
| | (0.00540) |
| Child_Report_INDUSTRY = 9, Personal services | 0.126 |
| | (0.0111) |
| Child_Report_INDUSTRY = 10, Entertainment | 0.497 |
| | (0.0138) |
| Child_Report_INDUSTRY = 11, Professional services | 0.463 |
| | (0.00474) |
| Child_Report_INDUSTRY = 12, Public administration | 0.614 |
| | (0.00469) |
| Father_Age19_Dummies = 1 | -0.666 |
| | (0.00424) |
| Father_Age19_Dummies = 2 | -0.320 |

| | |
|---|---|
| | (0.00376) |
| Father_Age19_Dummies = 3 | -0.207 |
| | (0.00363) |
| Father_Age19_Dummies = 4 | -0.125 |
| | (0.00379) |
| Father_Age19_Dummies = 6 | 0.0162 |
| | (0.00394) |
| Father_Age19_Dummies = 7 | -0.0594 |
| | (0.00390) |
| Father_Age19_Dummies = 8 | 0.0719 |
| | (0.00464) |
| Father_Age19_Dummies = 9 | -0.482 |
| | (0.00609) |
| Constant | 10.25 |
| | (0.0149) |
| Observations | 498,987 |
| R-squared | 0.428 |

**<u>Model M5a</u>. Time-average earnings as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.129 |
| | (0.00166) |
| Father_Race = 3, American Indian | -0.252 |
| | (0.00541) |
| Father_Race = 4, Asian | -0.188 |
| | (0.0104) |
| Father_Race = 5, Pacific Islander | 0.102 |
| | (0.0171) |
| Father_Race = 7, Other / Unknown | 0.0294 |
| | (0.00255) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.263 |
| | (0.00503) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.332 |
| | (0.00481) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.448 |
| | (0.00477) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.489 |
| | (0.00485) |
| Father_Report_Father_Ed = 6, College degree | 0.743 |
| | (0.00505) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.842 |
| | (0.00511) |
| Father_Report_Occ_Age_15 = 1 | 0.341 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 2 | 0.357 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 3 | 0.0987 |
| | (0.0125) |
| Father_Report_Occ_Age_15 = 4 | 0.436 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 5 | 0.499 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 6 | 0.397 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 10 | 1.006 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 11 | 0.492 |
| | (0.0117) |
| Father_Report_Occ_Age_15 = 12 | 0.544 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 13 | 0.390 |
| | (0.0106) |
| Father_Report_Occ_Age_15 = 14 | 0.506 |
| | (0.0105) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 22 | 0.172 |
| | (0.0137) |
| Father_Report_Occ_Age_15 = 25 | 0.101 |
| | (0.0134) |
| Father_Report_Occ_Age_15 = 30 | 0.603 |
| | (0.0169) |
| Father_Report_Occ_Age_15 = 31 | 1.044 |
| | (0.0135) |
| Father_Report_Occ_Age_15 = 44 | 0.560 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 45 | 0.0294 |
| | (0.0194) |
| Father_Report_Occ_Age_15 = 54 | 0.0528 |
| | (0.0243) |
| Father_Report_Occ_Age_15 = 55 | 0.412 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 56 | 0.446 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 62 | 0.539 |
| | (0.00933) |
| Father_Report_Occ_Age_15 = 63 | 0.773 |
| | (0.00929) |
| Father_Report_Occ_Age_15 = 64 | 0.996 |
| | (0.0181) |
| Father_Report_Occ_Age_15 = 65 | 1.716 |
| | (0.0128) |
| Father_Report_Occ_Age_15 = 72 | 1.159 |
| | (0.0227) |
| Father_Report_Occ_Age_15 = 75 | 0.316 |
| | (0.0137) |
| Father_Report_Occ_Age_15 = 80 | 0.339 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 83 | 0.422 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 85 | -0.758 |
| | (0.0180) |
| Father_Report_Occ_Age_15 = 86 | -0.114 |
| | (0.0125) |
| Father_Report_Occ_Age_15 = 91 | 0.393 |
| | (0.0184) |
| Father_Report_Occ_Age_15 = 93 | 0.403 |
| | (0.0230) |
| Father_Report_Occ_Age_15 = 100 | 0.215 |
| | (0.0184) |
| Father_Report_Occ_Age_15 = 111 | 0.743 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 112 | 0.602 |
| | (0.0130) |
| Father_Report_Occ_Age_15 = 115 | -0.0144 |
| | (0.0167) |
| Father_Report_Occ_Age_15 = 123 | 0.422 |
| | (0.0140) |
| Father_Report_Occ_Age_15 = 142 | 0.201 |
| | (0.0147) |
| Father_Report_Occ_Age_15 = 144 | 0.305 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 152 | 0.344 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 153 | 0.421 |
| | (0.0118) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 155 | 0.712 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 162 | 0.227 |
| | (0.0243) |
| Father_Report_Occ_Age_15 = 163 | 0.0205 |
| | (0.0167) |
| Father_Report_Occ_Age_15 = 171 | 0.765 |
| | (0.0140) |
| Father_Report_Occ_Age_15 = 173 | -0.0246 |
| | (0.0127) |
| Father_Report_Occ_Age_15 = 174 | 0.320 |
| | (0.0133) |
| Father_Report_Occ_Age_15 = 183 | 0.287 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 184 | 1.051 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 185 | 0.929 |
| | (0.00938) |
| Father_Report_Occ_Age_15 = 190 | 0.187 |
| | (0.0243) |
| Father_Report_Occ_Age_15 = 191 | 0.140 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 192 | 0.450 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 194 | 0.421 |
| | (0.0167) |
| Father_Report_Occ_Age_15 = 195 | 0.523 |
| | (0.0171) |
| Father_Report_Occ_Age_15 = 202 | 0.116 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 205 | 0.663 |
| | (0.0209) |
| Father_Report_Occ_Age_15 = 210 | 0.112 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 212 | 0.289 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 213 | 0.0874 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 215 | 0.479 |
| | (0.0170) |
| Father_Report_Occ_Age_15 = 216 | 0.218 |
| | (0.0137) |
| Father_Report_Occ_Age_15 = 220 | 0.515 |
| | (0.0128) |
| Father_Report_Occ_Age_15 = 222 | 0.200 |
| | (0.0167) |
| Father_Report_Occ_Age_15 = 223 | 0.516 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 225 | 0.294 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 226 | 0.830 |
| | (0.0151) |
| Father_Report_Occ_Age_15 = 230 | 1.991 |
| | (0.0208) |
| Father_Report_Occ_Age_15 = 231 | 0.652 |
| | (0.0112) |
| Father_Report_Occ_Age_15 = 233 | 0.651 |
| | (0.0116) |
| Father_Report_Occ_Age_15 = 235 | 0.813 |
| | (0.0124) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 240 | 0.477 |
| | (0.0123) |
| Father_Report_Occ_Age_15 = 245 | 0.473 |
| | (0.00972) |
| Father_Report_Occ_Age_15 = 260 | -0.741 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 265 | 0.140 |
| | (0.0118) |
| Father_Report_Occ_Age_15 = 270 | 0.640 |
| | (0.0143) |
| Father_Report_Occ_Age_15 = 271 | 0.687 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 281 | 0.200 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 282 | 0.275 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 283 | 0.553 |
| | (0.0135) |
| Father_Report_Occ_Age_15 = 284 | 0.238 |
| | (0.0119) |
| Father_Report_Occ_Age_15 = 285 | 0.395 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 303 | 0.161 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 305 | 0.474 |
| | (0.0176) |
| Father_Report_Occ_Age_15 = 312 | 0.395 |
| | (0.0189) |
| Father_Report_Occ_Age_15 = 321 | -0.263 |
| | (0.0173) |
| Father_Report_Occ_Age_15 = 323 | 0.433 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 331 | -0.0321 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 334 | 0.171 |
| | (0.0171) |
| Father_Report_Occ_Age_15 = 343 | 0.725 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 374 | 0.300 |
| | (0.0117) |
| Father_Report_Occ_Age_15 = 381 | 0.178 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 394 | 0.169 |
| | (0.0125) |
| Father_Report_Occ_Age_15 = 405 | 0.490 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 410 | -0.210 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 412 | -0.279 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 413 | -0.312 |
| | (0.0137) |
| Father_Report_Occ_Age_15 = 415 | 0.375 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 420 | 0.254 |
| | (0.0156) |
| Father_Report_Occ_Age_15 = 421 | 0.502 |
| | (0.0168) |
| Father_Report_Occ_Age_15 = 424 | 0.131 |
| | (0.0141) |

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|---|---|
| Father_Report_Occ_Age_15 = 426 | 0.0219 |
| | (0.0149) |
| Father_Report_Occ_Age_15 = 430 | 0.495 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 433 | 0.426 |
| | (0.0137) |
| Father_Report_Occ_Age_15 = 436 | 0.206 |
| | (0.0113) |
| Father_Report_Occ_Age_15 = 441 | 0.347 |
| | (0.0101) |
| Father_Report_Occ_Age_15 = 452 | -0.00945 |
| | (0.0144) |
| Father_Report_Occ_Age_15 = 454 | -0.0185 |
| | (0.0188) |
| Father_Report_Occ_Age_15 = 461 | 0.189 |
| | (0.0113) |
| Father_Report_Occ_Age_15 = 462 | -0.471 |
| | (0.0168) |
| Father_Report_Occ_Age_15 = 470 | 0.463 |
| | (0.0116) |
| Father_Report_Occ_Age_15 = 471 | 0.464 |
| | (0.0112) |
| Father_Report_Occ_Age_15 = 473 | 0.0876 |
| | (0.0106) |
| Father_Report_Occ_Age_15 = 474 | 0.205 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 481 | 0.179 |
| | (0.0105) |
| Father_Report_Occ_Age_15 = 482 | 0.254 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 483 | 0.262 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 484 | 0.318 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 492 | 0.256 |
| | (0.0121) |
| Father_Report_Occ_Age_15 = 495 | 0.489 |
| | (0.0177) |
| Father_Report_Occ_Age_15 = 502 | 0.430 |
| | (0.0116) |
| Father_Report_Occ_Age_15 = 510 | 0.158 |
| | (0.0108) |
| Father_Report_Occ_Age_15 = 522 | 0.380 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 525 | 0.259 |
| | (0.0170) |
| Father_Report_Occ_Age_15 = 530 | 0.371 |
| | (0.0169) |
| Father_Report_Occ_Age_15 = 534 | -1.081 |
| | (0.0169) |
| Father_Report_Occ_Age_15 = 535 | -0.183 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 540 | 0.708 |
| | (0.0171) |
| Father_Report_Occ_Age_15 = 545 | 0.498 |
| | (0.0125) |
| Father_Report_Occ_Age_15 = 550 | 0.678 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 552 | 0.289 |
| | (0.0122) |

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|---|---|
| Father_Report_Occ_Age_15 = 561 | -0.393 |
| | (0.0210) |
| Father_Report_Occ_Age_15 = 600 | 0.490 |
| | (0.0109) |
| Father_Report_Occ_Age_15 = 602 | -0.0514 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 610 | 0.0226 |
| | (0.0128) |
| Father_Report_Occ_Age_15 = 611 | 0.450 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 612 | -0.961 |
| | (0.0179) |
| Father_Report_Occ_Age_15 = 614 | -0.308 |
| | (0.0256) |
| Father_Report_Occ_Age_15 = 621 | 0.471 |
| | (0.0131) |
| Father_Report_Occ_Age_15 = 623 | 0.422 |
| | (0.0134) |
| Father_Report_Occ_Age_15 = 631 | 0.665 |
| | (0.0115) |
| Father_Report_Occ_Age_15 = 633 | 0.501 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 635 | 0.0315 |
| | (0.0186) |
| Father_Report_Occ_Age_15 = 640 | -0.0989 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 641 | 0.0705 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 642 | 0.311 |
| | (0.0148) |
| Father_Report_Occ_Age_15 = 643 | 0.303 |
| | (0.0116) |
| Father_Report_Occ_Age_15 = 644 | 0.00404 |
| | (0.0256) |
| Father_Report_Occ_Age_15 = 650 | 0.116 |
| | (0.0175) |
| Father_Report_Occ_Age_15 = 651 | 0.358 |
| | (0.0188) |
| Father_Report_Occ_Age_15 = 652 | 0.0375 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 653 | 0.841 |
| | (0.0124) |
| Father_Report_Occ_Age_15 = 662 | 0.0536 |
| | (0.0165) |
| Father_Report_Occ_Age_15 = 664 | 0.329 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 666 | 0.0518 |
| | (0.0147) |
| Father_Report_Occ_Age_15 = 673 | 0.374 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 674 | -0.0115 |
| | (0.0176) |
| Father_Report_Occ_Age_15 = 680 | 0.0695 |
| | (0.0114) |
| Father_Report_Occ_Age_15 = 690 | 0.148 |
| | (0.0110) |
| Father_Report_Occ_Age_15 = 692 | -0.0354 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 694 | 0.0824 |
| | (0.0117) |

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|---|---|
| Father_Report_Occ_Age_15 = 695 | 0.143 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 703 | 0.0402 |
| | (0.0174) |
| Father_Report_Occ_Age_15 = 705 | 0.296 |
| | (0.0109) |
| Father_Report_Occ_Age_15 = 706 | 0.0177 |
| | (0.0112) |
| Father_Report_Occ_Age_15 = 710 | 0.238 |
| | (0.0187) |
| Father_Report_Occ_Age_15 = 715 | 0.149 |
| | (0.0100) |
| Father_Report_Occ_Age_15 = 740 | 0.00985 |
| | (0.0301) |
| Father_Report_Occ_Age_15 = 750 | -0.114 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 751 | 0.232 |
| | (0.0106) |
| Father_Report_Occ_Age_15 = 753 | 0.123 |
| | (0.0111) |
| Father_Report_Occ_Age_15 = 755 | -0.330 |
| | (0.0142) |
| Father_Report_Occ_Age_15 = 761 | -0.0121 |
| | (0.0136) |
| Father_Report_Occ_Age_15 = 762 | -0.134 |
| | (0.0134) |
| Father_Report_Occ_Age_15 = 770 | 0.295 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 780 | 0.264 |
| | (0.0145) |
| Father_Report_Occ_Age_15 = 801 | 0.00386 |
| | (0.0129) |
| Father_Report_Occ_Age_15 = 822 | -0.449 |
| | (0.0133) |
| Father_Report_Occ_Age_15 = 824 | -0.101 |
| | (0.0229) |
| Father_Report_Occ_Age_15 = 902 | 0.296 |
| | (0.0126) |
| Father_Report_Occ_Age_15 = 903 | 0.0937 |
| | (0.00957) |
| Father_Report_Occ_Age_15 = 910 | 1.322 |
| | (0.0203) |
| Father_Report_Occ_Age_15 = 912 | 1.886 |
| | (0.0259) |
| Father_Report_Occ_Age_15 = 925 | -0.390 |
| | (0.0141) |
| Father_Report_Occ_Age_15 = 926 | 0.372 |
| | (0.0139) |
| Father_Report_Occ_Age_15 = 932, omitted | - |
| Father_Report_Occ_Age_15 = 950 | 0.456 |
| | (0.0164) |
| Father_Report_Occ_Age_15 = 961 | 0.424 |
| | (0.0120) |
| Father_Report_Occ_Age_15 = 962 | -0.0352 |
| | (0.0114) |
| Father_Report_Occ_Age_15 = 964 | 0.502 |
| | (0.0109) |
| Father_Report_Occ_Age_15 = 999 | 0.477 |
| | (0.0129) |

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|---|---|
| Father_Report_Ind_Age_15 = 17 | 0.0688 |
| | (0.0126) |
| Father_Report_Ind_Age_15 = 18 | -0.337 |
| | (0.0185) |
| Father_Report_Ind_Age_15 = 19 | 0.480 |
| | (0.0142) |
| Father_Report_Ind_Age_15 = 47 | 0.444 |
| | (0.0138) |
| Father_Report_Ind_Age_15 = 48 | 0.532 |
| | (0.0122) |
| Father_Report_Ind_Age_15 = 49 | 0.476 |
| | (0.0222) |
| Father_Report_Ind_Age_15 = 57 | 0.185 |
| | (0.0142) |
| Father_Report_Ind_Age_15 = 67 | 0.0644 |
| | (0.0104) |
| Father_Report_Ind_Age_15 = 68 | 0.129 |
| | (0.0104) |
| Father_Report_Ind_Age_15 = 69 | 0.355 |
| | (0.00958) |
| Father_Report_Ind_Age_15 = 77 | 0.466 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 107 | -0.209 |
| | (0.0128) |
| Father_Report_Ind_Age_15 = 108 | 0.494 |
| | (0.0108) |
| Father_Report_Ind_Age_15 = 109 | 0.285 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 118 | 0.262 |
| | (0.0116) |
| Father_Report_Ind_Age_15 = 119 | 0.404 |
| | (0.0166) |
| Father_Report_Ind_Age_15 = 127 | 0.313 |
| | (0.0133) |
| Father_Report_Ind_Age_15 = 137 | 0.117 |
| | (0.0215) |
| Father_Report_Ind_Age_15 = 138 | 0.0949 |
| | (0.0140) |
| Father_Report_Ind_Age_15 = 139 | 0.377 |
| | (0.0171) |
| Father_Report_Ind_Age_15 = 147 | 0.448 |
| | (0.0119) |
| Father_Report_Ind_Age_15 = 148 | 1.023 |
| | (0.0165) |
| Father_Report_Ind_Age_15 = 149 | 0.327 |
| | (0.0164) |
| Father_Report_Ind_Age_15 = 158 | 0.226 |
| | (0.0115) |
| Father_Report_Ind_Age_15 = 168 | 0.300 |
| | (0.0138) |
| Father_Report_Ind_Age_15 = 177 | 0.386 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 178 | 0.669 |
| | (0.0118) |
| Father_Report_Ind_Age_15 = 179 | 0.244 |
| | (0.0111) |
| Father_Report_Ind_Age_15 = 187, omitted | - |
| Father_Report_Ind_Age_15 = 188 | 0.308 |
| | (0.0111) |

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|---|---|
| Father_Report_Ind_Age_15 = 189 | 0.279 |
| | (0.0105) |
| Father_Report_Ind_Age_15 = 197 | 0.386 |
| | (0.0112) |
| Father_Report_Ind_Age_15 = 198 | 0.347 |
| | (0.0136) |
| Father_Report_Ind_Age_15 = 199, omitted | - |
| Father_Report_Ind_Age_15 = 207 | 0.342 |
| | (0.0135) |
| Father_Report_Ind_Age_15 = 208 | 0.357 |
| | (0.0105) |
| Father_Report_Ind_Age_15 = 209 | 0.288 |
| | (0.0134) |
| Father_Report_Ind_Age_15 = 219 | 0.522 |
| | (0.0105) |
| Father_Report_Ind_Age_15 = 227 | 0.462 |
| | (0.0105) |
| Father_Report_Ind_Age_15 = 228 | 0.0167 |
| | (0.0115) |
| Father_Report_Ind_Age_15 = 229 | 0.295 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 237 | 0.306 |
| | (0.0170) |
| Father_Report_Ind_Age_15 = 247 | 0.406 |
| | (0.0124) |
| Father_Report_Ind_Age_15 = 258 | 0.265 |
| | (0.0164) |
| Father_Report_Ind_Age_15 = 259 | 0.141 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 268 | 0.309 |
| | (0.0108) |
| Father_Report_Ind_Age_15 = 269 | 0.0447 |
| | (0.0169) |
| Father_Report_Ind_Age_15 = 287 | 0.152 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 289 | 0.380 |
| | (0.0134) |
| Father_Report_Ind_Age_15 = 307, omitted | - |
| Father_Report_Ind_Age_15 = 317 | -0.0912 |
| | (0.0120) |
| Father_Report_Ind_Age_15 = 319 | 0.0524 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 327 | 0.00435 |
| | (0.0140) |
| Father_Report_Ind_Age_15 = 328 | 0.289 |
| | (0.0122) |
| Father_Report_Ind_Age_15 = 329 | 0.325 |
| | (0.0165) |
| Father_Report_Ind_Age_15 = 337 | 0.0984 |
| | (0.0138) |
| Father_Report_Ind_Age_15 = 338 | 0.586 |
| | (0.0116) |
| Father_Report_Ind_Age_15 = 339 | 0.444 |
| | (0.0106) |
| Father_Report_Ind_Age_15 = 347 | 0.404 |
| | (0.0123) |
| Father_Report_Ind_Age_15 = 348 | 0.198 |
| | (0.0134) |

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|---|---|
| Father_Report_Ind_Age_15 = 357 | 0.0394 |
| | (0.0183) |
| Father_Report_Ind_Age_15 = 358 | 0.326 |
| | (0.0133) |
| Father_Report_Ind_Age_15 = 359 | 0.0523 |
| | (0.0135) |
| Father_Report_Ind_Age_15 = 368 | 0.262 |
| | (0.0135) |
| Father_Report_Ind_Age_15 = 369 | 0.410 |
| | (0.0130) |
| Father_Report_Ind_Age_15 = 377 | 0.396 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 379 | 0.260 |
| | (0.0112) |
| Father_Report_Ind_Age_15 = 387 | -0.313 |
| | (0.0127) |
| Father_Report_Ind_Age_15 = 388 | 0.313 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 389 | -0.474 |
| | (0.0137) |
| Father_Report_Ind_Age_15 = 398 | 0.329 |
| | (0.0174) |
| Father_Report_Ind_Age_15 = 407 | 0.162 |
| | (0.0118) |
| Father_Report_Ind_Age_15 = 408 | 0.0262 |
| | (0.0164) |
| Father_Report_Ind_Age_15 = 417 | 0.354 |
| | (0.0101) |
| Father_Report_Ind_Age_15 = 427 | 0.331 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 447 | -0.130 |
| | (0.0128) |
| Father_Report_Ind_Age_15 = 448 | 0.461 |
| | (0.0112) |
| Father_Report_Ind_Age_15 = 467 | 0.578 |
| | (0.0114) |
| Father_Report_Ind_Age_15 = 468 | 0.475 |
| | (0.0164) |
| Father_Report_Ind_Age_15 = 469 | 0.191 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 477 | 0.0136 |
| | (0.0160) |
| Father_Report_Ind_Age_15 = 478 | -0.0376 |
| | (0.0136) |
| Father_Report_Ind_Age_15 = 479 | 0.287 |
| | (0.0210) |
| Father_Report_Ind_Age_15 = 507 | 0.286 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 508 | -0.0935 |
| | (0.0140) |
| Father_Report_Ind_Age_15 = 509 | 0.0840 |
| | (0.0159) |
| Father_Report_Ind_Age_15 = 527 | 0.0776 |
| | (0.0109) |
| Father_Report_Ind_Age_15 = 528 | 0.572 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 529 | -0.336 |
| | (0.0124) |
| Father_Report_Ind_Age_15 = 537 | 0.423 |
| | (0.0122) |

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|---|---|
| Father_Report_Ind_Age_15 = 538 | -0.146 |
| | (0.0165) |
| Father_Report_Ind_Age_15 = 539 | 0.269 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 558 | 1.602 |
| | (0.0170) |
| Father_Report_Ind_Age_15 = 559 | 0.0586 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 567 | 0.197 |
| | (0.0129) |
| Father_Report_Ind_Age_15 = 568 | 0.214 |
| | (0.0120) |
| Father_Report_Ind_Age_15 = 569 | 0.152 |
| | (0.0146) |
| Father_Report_Ind_Age_15 = 587 | 0.752 |
| | (0.0112) |
| Father_Report_Ind_Age_15 = 588 | -0.0548 |
| | (0.0172) |
| Father_Report_Ind_Age_15 = 607 | 0.284 |
| | (0.0119) |
| Father_Report_Ind_Age_15 = 609 | -0.386 |
| | (0.0140) |
| Father_Report_Ind_Age_15 = 617 | 0.751 |
| | (0.0166) |
| Father_Report_Ind_Age_15 = 618 | -0.259 |
| | (0.0133) |
| Father_Report_Ind_Age_15 = 627 | -0.0568 |
| | (0.0160) |
| Father_Report_Ind_Age_15 = 628 | -0.179 |
| | (0.0105) |
| Father_Report_Ind_Age_15 = 637 | -0.320 |
| | (0.0143) |
| Father_Report_Ind_Age_15 = 638 | -0.559 |
| | (0.0136) |
| Father_Report_Ind_Age_15 = 639 | 0.188 |
| | (0.0108) |
| Father_Report_Ind_Age_15 = 648 | -0.217 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 649 | -0.0235 |
| | (0.0115) |
| Father_Report_Ind_Age_15 = 657 | 0.683 |
| | (0.0160) |
| Father_Report_Ind_Age_15 = 658 | -0.163 |
| | (0.0134) |
| Father_Report_Ind_Age_15 = 667, omitted | - |
| Father_Report_Ind_Age_15 = 668 | -0.154 |
| | (0.0119) |
| Father_Report_Ind_Age_15 = 669 | -0.685 |
| | (0.0162) |
| Father_Report_Ind_Age_15 = 677 | -0.587 |
| | (0.0172) |
| Father_Report_Ind_Age_15 = 678 | -0.413 |
| | (0.0160) |
| Father_Report_Ind_Age_15 = 679 | -0.230 |
| | (0.0129) |
| Father_Report_Ind_Age_15 = 689 | 0.0367 |
| | (0.0158) |
| Father_Report_Ind_Age_15 = 697 | 0.0817 |
| | (0.0132) |

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|---|---|
| Father_Report_Ind_Age_15 = 698 | 0.751 |
| | (0.0162) |
| Father_Report_Ind_Age_15 = 707 | 0.412 |
| | (0.0128) |
| Father_Report_Ind_Age_15 = 708 | 0.359 |
| | (0.0141) |
| Father_Report_Ind_Age_15 = 709 | 0.168 |
| | (0.0158) |
| Father_Report_Ind_Age_15 = 717 | 0.655 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 718 | 0.0204 |
| | (0.0111) |
| Father_Report_Ind_Age_15 = 728 | 0.647 |
| | (0.0162) |
| Father_Report_Ind_Age_15 = 738 | 0.444 |
| | (0.0205) |
| Father_Report_Ind_Age_15 = 739 | 0.250 |
| | (0.0125) |
| Father_Report_Ind_Age_15 = 747 | 0.0481 |
| | (0.0169) |
| Father_Report_Ind_Age_15 = 748 | -0.371 |
| | (0.0131) |
| Father_Report_Ind_Age_15 = 757 | -0.0943 |
| | (0.0111) |
| Father_Report_Ind_Age_15 = 758 | -0.00560 |
| | (0.0178) |
| Father_Report_Ind_Age_15 = 759 | 0.0488 |
| | (0.0128) |
| Father_Report_Ind_Age_15 = 777 | -1.380 |
| | (0.0224) |
| Father_Report_Ind_Age_15 = 778 | 0.220 |
| | (0.0128) |
| Father_Report_Ind_Age_15 = 779 | 0.0723 |
| | (0.0109) |
| Father_Report_Ind_Age_15 = 798, omitted | - |
| Father_Report_Ind_Age_15 = 807, omitted | - |
| Father_Report_Ind_Age_15 = 809 | 0.164 |
| | (0.0137) |
| Father_Report_Ind_Age_15 = 828 | -0.0512 |
| | (0.0134) |
| Father_Report_Ind_Age_15 = 829, omitted | - |
| Father_Report_Ind_Age_15 = 838 | 0.228 |
| | (0.0106) |
| Father_Report_Ind_Age_15 = 839 | 0.616 |
| | (0.0181) |
| Father_Report_Ind_Age_15 = 847, omitted | - |
| Father_Report_Ind_Age_15 = 848 | 0.382 |
| | (0.0117) |
| Father_Report_Ind_Age_15 = 849 | 0.341 |
| | (0.0152) |
| Father_Report_Ind_Age_15 = 857 | -0.000853 |
| | (0.0114) |
| Father_Report_Ind_Age_15 = 858 | 0.0742 |
| | (0.0104) |
| Father_Report_Ind_Age_15 = 867 | 0.321 |
| | (0.0160) |

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|---|---|
| Father_Report_Ind_Age_15 = 868 | -0.105 |
| | (0.0161) |
| Father_Report_Ind_Age_15 = 869 | 0.436 |
| | (0.0173) |
| Father_Report_Ind_Age_15 = 877 | 0.212 |
| | (0.0117) |
| Father_Report_Ind_Age_15 = 878 | 0.0850 |
| | (0.0162) |
| Father_Report_Ind_Age_15 = 879 | -0.438 |
| | (0.0163) |
| Father_Report_Ind_Age_15 = 887 | -0.486 |
| | (0.0131) |
| Father_Report_Ind_Age_15 = 888 | 0.339 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 889 | 0.604 |
| | (0.0119) |
| Father_Report_Ind_Age_15 = 897 | 0.444 |
| | (0.0272) |
| Father_Report_Ind_Age_15 = 907 | 0.445 |
| | (0.0136) |
| Father_Report_Ind_Age_15 = 917 | 0.0761 |
| | (0.0104) |
| Father_Report_Ind_Age_15 = 927 | 0.175 |
| | (0.0108) |
| Father_Report_Ind_Age_15 = 937 | 0.0664 |
| | (0.0110) |
| Father_Report_Ind_Age_15 = 999 | 0.00473 |
| | (0.0113) |
| Constant | 9.888 |
| | (0.00490) |
| Observations | 500,000 |
| R-squared | 0.740 |

**<u>Model M5b</u>. Father's earnings in 1980 as the first-stage dependent variable. Father's own reports of Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.176 |
| | (0.00284) |
| Father_Race = 3, American Indian | -0.429 |
| | (0.00928) |
| Father_Race = 4, Asian | -0.282 |
| | (0.0178) |
| Father_Race = 5, Pacific Islander | 1.519 |
| | (0.0291) |
| Father_Race = 7, Other / Unknown | 0.0272 |
| | (0.00440) |
| Father_Report_Father_Ed = 2, Grades 6 - 8 | 0.267 |
| | (0.00867) |
| Father_Report_Father_Ed = 3, Grades 9 - 11 | 0.199 |
| | (0.00844) |
| Father_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.362 |
| | (0.00841) |
| Father_Report_Father_Ed = 5, Some college / associates degree | 0.437 |
| | (0.00864) |
| Father_Report_Father_Ed = 6, College degree | 0.540 |
| | (0.00895) |
| Father_Report_Father_Ed = 7, Advanced college degree | 0.581 |
| | (0.00911) |
| Father_Report_Occ_Age_15 = 1 | 2.295 |
| | (0.0187) |
| Father_Report_Occ_Age_15 = 2 | 1.909 |
| | (0.0245) |
| Father_Report_Occ_Age_15 = 3 | 1.790 |
| | (0.0213) |
| Father_Report_Occ_Age_15 = 4 | 2.150 |
| | (0.0223) |
| Father_Report_Occ_Age_15 = 5 | 2.069 |
| | (0.0247) |
| Father_Report_Occ_Age_15 = 6 | 1.797 |
| | (0.0281) |
| Father_Report_Occ_Age_15 = 10 | 2.376 |
| | (0.0231) |
| Father_Report_Occ_Age_15 = 11 | 2.471 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 12 | 2.237 |
| | (0.0187) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 13 | 2.354 |
| | (0.0180) |
| Father_Report_Occ_Age_15 = 14 | 2.283 |
| | (0.0180) |
| Father_Report_Occ_Age_15 = 22 | 1.876 |
| | (0.0232) |
| Father_Report_Occ_Age_15 = 25 | 1.779 |
| | (0.0228) |
| Father_Report_Occ_Age_15 = 30 | 1.859 |
| | (0.0287) |
| Father_Report_Occ_Age_15 = 31 | 1.850 |
| | (0.0229) |
| Father_Report_Occ_Age_15 = 44 | 2.022 |
| | (0.0294) |
| Father_Report_Occ_Age_15 = 45 | 2.142 |
| | (0.0333) |
| Father_Report_Occ_Age_15 = 54 | 1.616 |
| | (0.0412) |
| Father_Report_Occ_Age_15 = 55 | 1.636 |
| | (0.0215) |
| Father_Report_Occ_Age_15 = 56 | 2.036 |
| | (0.0185) |
| Father_Report_Occ_Age_15 = 62 | 0.672 |
| | (0.0160) |
| Father_Report_Occ_Age_15 = 63 | 0.780 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 64 | 2.684 |
| | (0.0308) |
| Father_Report_Occ_Age_15 = 65 | 2.326 |
| | (0.0219) |
| Father_Report_Occ_Age_15 = 72 | -1.342 |
| | (0.0387) |
| Father_Report_Occ_Age_15 = 75 | 2.130 |
| | (0.0232) |
| Father_Report_Occ_Age_15 = 80 | 1.856 |
| | (0.0244) |
| Father_Report_Occ_Age_15 = 83 | 1.723 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 85 | 1.727 |
| | (0.0307) |
| Father_Report_Occ_Age_15 = 86 | 2.201 |
| | (0.0213) |
| Father_Report_Occ_Age_15 = 91 | 1.749 |
| | (0.0312) |
| Father_Report_Occ_Age_15 = 93 | 2.149 |
| | (0.0393) |
| Father_Report_Occ_Age_15 = 100 | 1.653 |
| | (0.0314) |
| Father_Report_Occ_Age_15 = 111 | 3.205 |
| | (0.0285) |
| Father_Report_Occ_Age_15 = 112 | 2.042 |
| | (0.0222) |
| Father_Report_Occ_Age_15 = 115 | 1.680 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 123 | 2.259 |
| | (0.0239) |
| Father_Report_Occ_Age_15 = 142 | 2.351 |
| | (0.0249) |
| Father_Report_Occ_Age_15 = 144 | 2.336 |
| | (0.0203) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 152 | 1.904 |
| | (0.0245) |
| Father_Report_Occ_Age_15 = 153 | 2.290 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 155 | 2.684 |
| | (0.0236) |
| Father_Report_Occ_Age_15 = 162 | 1.877 |
| | (0.0412) |
| Father_Report_Occ_Age_15 = 163 | 1.851 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 171 | 2.791 |
| | (0.0238) |
| Father_Report_Occ_Age_15 = 173 | 2.039 |
| | (0.0216) |
| Father_Report_Occ_Age_15 = 174 | 2.300 |
| | (0.0225) |
| Father_Report_Occ_Age_15 = 183 | 1.771 |
| | (0.0280) |
| Father_Report_Occ_Age_15 = 184 | 2.808 |
| | (0.0236) |
| Father_Report_Occ_Age_15 = 185 | 1.056 |
| | (0.0161) |
| Father_Report_Occ_Age_15 = 190 | 2.001 |
| | (0.0413) |
| Father_Report_Occ_Age_15 = 191 | -0.170 |
| | (0.0220) |
| Father_Report_Occ_Age_15 = 192 | 2.375 |
| | (0.0298) |
| Father_Report_Occ_Age_15 = 194 | 1.842 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 195 | 2.311 |
| | (0.0290) |
| Father_Report_Occ_Age_15 = 202 | 1.791 |
| | (0.0206) |
| Father_Report_Occ_Age_15 = 205 | 2.840 |
| | (0.0358) |
| Father_Report_Occ_Age_15 = 210 | 1.576 |
| | (0.0303) |
| Father_Report_Occ_Age_15 = 212 | 2.022 |
| | (0.0220) |
| Father_Report_Occ_Age_15 = 213 | 1.493 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 215 | 2.194 |
| | (0.0288) |
| Father_Report_Occ_Age_15 = 216 | 1.727 |
| | (0.0232) |
| Father_Report_Occ_Age_15 = 220 | 2.008 |
| | (0.0219) |
| Father_Report_Occ_Age_15 = 222 | 2.223 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 223 | 2.574 |
| | (0.0244) |
| Father_Report_Occ_Age_15 = 225 | 1.974 |
| | (0.0220) |
| Father_Report_Occ_Age_15 = 226 | 2.719 |
| | (0.0256) |
| Father_Report_Occ_Age_15 = 230 | 4.165 |
| | (0.0354) |
| Father_Report_Occ_Age_15 = 231 | 2.352 |
| | (0.0191) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 233 | 2.259 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 235 | 2.577 |
| | (0.0210) |
| Father_Report_Occ_Age_15 = 240 | 2.729 |
| | (0.0209) |
| Father_Report_Occ_Age_15 = 245 | 2.183 |
| | (0.0166) |
| Father_Report_Occ_Age_15 = 260 | 1.155 |
| | (0.0297) |
| Father_Report_Occ_Age_15 = 265 | 2.064 |
| | (0.0200) |
| Father_Report_Occ_Age_15 = 270 | 2.422 |
| | (0.0244) |
| Father_Report_Occ_Age_15 = 271 | 1.619 |
| | (0.0299) |
| Father_Report_Occ_Age_15 = 281 | 2.155 |
| | (0.0205) |
| Father_Report_Occ_Age_15 = 282 | 1.889 |
| | (0.0183) |
| Father_Report_Occ_Age_15 = 283 | 2.425 |
| | (0.0230) |
| Father_Report_Occ_Age_15 = 284 | 0.781 |
| | (0.0203) |
| Father_Report_Occ_Age_15 = 285 | 1.792 |
| | (0.0275) |
| Father_Report_Occ_Age_15 = 303 | 2.779 |
| | (0.0284) |
| Father_Report_Occ_Age_15 = 305 | 1.970 |
| | (0.0299) |
| Father_Report_Occ_Age_15 = 312 | 3.814 |
| | (0.0323) |
| Father_Report_Occ_Age_15 = 321 | 2.142 |
| | (0.0294) |
| Father_Report_Occ_Age_15 = 323 | 2.298 |
| | (0.0295) |
| Father_Report_Occ_Age_15 = 331 | 1.315 |
| | (0.0245) |
| Father_Report_Occ_Age_15 = 334 | 2.325 |
| | (0.0291) |
| Father_Report_Occ_Age_15 = 343 | 2.187 |
| | (0.0233) |
| Father_Report_Occ_Age_15 = 374 | 1.886 |
| | (0.0199) |
| Father_Report_Occ_Age_15 = 381 | 1.303 |
| | (0.0188) |
| Father_Report_Occ_Age_15 = 394 | 1.819 |
| | (0.0213) |
| Father_Report_Occ_Age_15 = 405 | 1.548 |
| | (0.0280) |
| Father_Report_Occ_Age_15 = 410 | 1.480 |
| | (0.0224) |
| Father_Report_Occ_Age_15 = 412 | 1.701 |
| | (0.0248) |
| Father_Report_Occ_Age_15 = 413 | 0.326 |
| | (0.0232) |
| Father_Report_Occ_Age_15 = 415 | 2.150 |
| | (0.0184) |
| Father_Report_Occ_Age_15 = 420 | 1.864 |
| | (0.0267) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 421 | 2.870 |
| | (0.0285) |
| Father_Report_Occ_Age_15 = 424 | 1.034 |
| | (0.0241) |
| Father_Report_Occ_Age_15 = 426 | 1.490 |
| | (0.0255) |
| Father_Report_Occ_Age_15 = 430 | 2.317 |
| | (0.0183) |
| Father_Report_Occ_Age_15 = 433 | 2.180 |
| | (0.0234) |
| Father_Report_Occ_Age_15 = 436 | 1.925 |
| | (0.0194) |
| Father_Report_Occ_Age_15 = 441 | 1.967 |
| | (0.0172) |
| Father_Report_Occ_Age_15 = 452 | 1.776 |
| | (0.0247) |
| Father_Report_Occ_Age_15 = 454 | 1.688 |
| | (0.0321) |
| Father_Report_Occ_Age_15 = 461 | 1.675 |
| | (0.0192) |
| Father_Report_Occ_Age_15 = 462 | 1.776 |
| | (0.0286) |
| Father_Report_Occ_Age_15 = 470 | 2.135 |
| | (0.0198) |
| Father_Report_Occ_Age_15 = 471 | 2.101 |
| | (0.0191) |
| Father_Report_Occ_Age_15 = 473 | 1.729 |
| | (0.0181) |
| Father_Report_Occ_Age_15 = 474 | 2.192 |
| | (0.0292) |
| Father_Report_Occ_Age_15 = 481 | 1.826 |
| | (0.0178) |
| Father_Report_Occ_Age_15 = 482 | 2.097 |
| | (0.0294) |
| Father_Report_Occ_Age_15 = 483 | 0.0922 |
| | (0.0224) |
| Father_Report_Occ_Age_15 = 484 | 1.954 |
| | (0.0247) |
| Father_Report_Occ_Age_15 = 492 | 1.542 |
| | (0.0207) |
| Father_Report_Occ_Age_15 = 495 | 1.903 |
| | (0.0301) |
| Father_Report_Occ_Age_15 = 502 | 2.496 |
| | (0.0196) |
| Father_Report_Occ_Age_15 = 510 | 1.881 |
| | (0.0185) |
| Father_Report_Occ_Age_15 = 522 | 1.681 |
| | (0.0281) |
| Father_Report_Occ_Age_15 = 525 | 2.185 |
| | (0.0290) |
| Father_Report_Occ_Age_15 = 530 | 1.752 |
| | (0.0288) |
| Father_Report_Occ_Age_15 = 534 | 0.316 |
| | (0.0287) |
| Father_Report_Occ_Age_15 = 535 | 1.764 |
| | (0.0291) |
| Father_Report_Occ_Age_15 = 540 | 2.396 |
| | (0.0293) |
| Father_Report_Occ_Age_15 = 545 | 2.169 |
| | (0.0214) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 550 | 2.686 |
| | (0.0231) |
| Father_Report_Occ_Age_15 = 552 | 2.007 |
| | (0.0207) |
| Father_Report_Occ_Age_15 = 561 | 0.226 |
| | (0.0361) |
| Father_Report_Occ_Age_15 = 600 | 1.719 |
| | (0.0186) |
| Father_Report_Occ_Age_15 = 602 | 1.897 |
| | (0.0187) |
| Father_Report_Occ_Age_15 = 610 | 2.109 |
| | (0.0217) |
| Father_Report_Occ_Age_15 = 611 | 1.428 |
| | (0.0303) |
| Father_Report_Occ_Age_15 = 612 | 0.268 |
| | (0.0305) |
| Father_Report_Occ_Age_15 = 614 | 1.140 |
| | (0.0434) |
| Father_Report_Occ_Age_15 = 621 | 0.414 |
| | (0.0225) |
| Father_Report_Occ_Age_15 = 623 | 2.549 |
| | (0.0229) |
| Father_Report_Occ_Age_15 = 631 | 2.107 |
| | (0.0197) |
| Father_Report_Occ_Age_15 = 633 | 2.202 |
| | (0.0214) |
| Father_Report_Occ_Age_15 = 635 | -1.413 |
| | (0.0317) |
| Father_Report_Occ_Age_15 = 640 | 1.314 |
| | (0.0262) |
| Father_Report_Occ_Age_15 = 641 | 1.788 |
| | (0.0205) |
| Father_Report_Occ_Age_15 = 642 | 2.250 |
| | (0.0253) |
| Father_Report_Occ_Age_15 = 643 | 1.879 |
| | (0.0197) |
| Father_Report_Occ_Age_15 = 644 | 1.601 |
| | (0.0434) |
| Father_Report_Occ_Age_15 = 650 | 2.099 |
| | (0.0298) |
| Father_Report_Occ_Age_15 = 651 | 2.476 |
| | (0.0320) |
| Father_Report_Occ_Age_15 = 652 | 1.909 |
| | (0.0217) |
| Father_Report_Occ_Age_15 = 653 | 1.759 |
| | (0.0217) |
| Father_Report_Occ_Age_15 = 662 | 1.848 |
| | (0.0279) |
| Father_Report_Occ_Age_15 = 664 | 1.806 |
| | (0.0281) |
| Father_Report_Occ_Age_15 = 666 | -0.0108 |
| | (0.0249) |
| Father_Report_Occ_Age_15 = 673 | 2.023 |
| | (0.0304) |
| Father_Report_Occ_Age_15 = 674 | 1.031 |
| | (0.0302) |
| Father_Report_Occ_Age_15 = 680 | 1.572 |
| | (0.0194) |
| Father_Report_Occ_Age_15 = 690 | 1.843 |
| | (0.0188) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 692 | 0.748 |
| | (0.0214) |
| Father_Report_Occ_Age_15 = 694 | 1.957 |
| | (0.0201) |
| Father_Report_Occ_Age_15 = 695 | 2.007 |
| | (0.0236) |
| Father_Report_Occ_Age_15 = 703 | 2.438 |
| | (0.0296) |
| Father_Report_Occ_Age_15 = 705 | 2.061 |
| | (0.0185) |
| Father_Report_Occ_Age_15 = 706 | 1.644 |
| | (0.0191) |
| Father_Report_Occ_Age_15 = 710 | 2.316 |
| | (0.0319) |
| Father_Report_Occ_Age_15 = 715 | 1.647 |
| | (0.0171) |
| Father_Report_Occ_Age_15 = 740 | 1.603 |
| | (0.0511) |
| Father_Report_Occ_Age_15 = 751 | 1.862 |
| | (0.0180) |
| Father_Report_Occ_Age_15 = 753 | 1.780 |
| | (0.0189) |
| Father_Report_Occ_Age_15 = 755 | 1.180 |
| | (0.0243) |
| Father_Report_Occ_Age_15 = 761 | 1.315 |
| | (0.0231) |
| Father_Report_Occ_Age_15 = 762 | 2.283 |
| | (0.0227) |
| Father_Report_Occ_Age_15 = 770 | 1.426 |
| | (0.0246) |
| Father_Report_Occ_Age_15 = 780 | 2.134 |
| | (0.0248) |
| Father_Report_Occ_Age_15 = 801 | 1.099 |
| | (0.0220) |
| Father_Report_Occ_Age_15 = 822 | 0.628 |
| | (0.0228) |
| Father_Report_Occ_Age_15 = 824 | 2.009 |
| | (0.0390) |
| Father_Report_Occ_Age_15 = 902 | 1.722 |
| | (0.0216) |
| Father_Report_Occ_Age_15 = 903 | 1.939 |
| | (0.0163) |
| Father_Report_Occ_Age_15 = 910 | 3.816 |
| | (0.0346) |
| Father_Report_Occ_Age_15 = 912 | 5.279 |
| | (0.0442) |
| Father_Report_Occ_Age_15 = 925 | 2.170 |
| | (0.0239) |
| Father_Report_Occ_Age_15 = 926 | 2.465 |
| | (0.0236) |
| Father_Report_Occ_Age_15 = 932, omitted | - |
| Father_Report_Occ_Age_15 = 950 | 1.907 |
| | (0.0280) |
| Father_Report_Occ_Age_15 = 961 | 1.958 |
| | (0.0204) |
| Father_Report_Occ_Age_15 = 962 | 1.905 |
| | (0.0195) |
| Father_Report_Occ_Age_15 = 964 | 1.999 |
| | (0.0186) |

| | |
|---|---|
| Father_Report_Occ_Age_15 = 999 | 0.780 |
| | (0.0220) |
| Father_Report_Ind_Age_15 = 17 | -1.194 |
| | (0.0216) |
| Father_Report_Ind_Age_15 = 18 | -1.621 |
| | (0.0316) |
| Father_Report_Ind_Age_15 = 19 | -1.032 |
| | (0.0243) |
| Father_Report_Ind_Age_15 = 47 | -1.431 |
| | (0.0234) |
| Father_Report_Ind_Age_15 = 48 | -1.195 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 49 | -0.810 |
| | (0.0376) |
| Father_Report_Ind_Age_15 = 57 | -1.226 |
| | (0.0275) |
| Father_Report_Ind_Age_15 = 67 | -1.403 |
| | (0.0176) |
| Father_Report_Ind_Age_15 = 68 | -1.582 |
| | (0.0178) |
| Father_Report_Ind_Age_15 = 69 | -1.255 |
| | (0.0163) |
| Father_Report_Ind_Age_15 = 77 | -1.277 |
| | (0.0187) |
| Father_Report_Ind_Age_15 = 107 | -1.125 |
| | (0.0218) |
| Father_Report_Ind_Age_15 = 108 | -1.162 |
| | (0.0186) |
| Father_Report_Ind_Age_15 = 109 | -0.511 |
| | (0.0213) |
| Father_Report_Ind_Age_15 = 118 | -1.575 |
| | (0.0198) |
| Father_Report_Ind_Age_15 = 119 | -1.617 |
| | (0.0283) |
| Father_Report_Ind_Age_15 = 127 | -1.137 |
| | (0.0227) |
| Father_Report_Ind_Age_15 = 137 | -1.634 |
| | (0.0365) |
| Father_Report_Ind_Age_15 = 138 | -1.621 |
| | (0.0239) |
| Father_Report_Ind_Age_15 = 139 | -1.018 |
| | (0.0289) |
| Father_Report_Ind_Age_15 = 147 | -1.236 |
| | (0.0204) |
| Father_Report_Ind_Age_15 = 148 | -0.456 |
| | (0.0280) |
| Father_Report_Ind_Age_15 = 149 | -0.479 |
| | (0.0285) |
| Father_Report_Ind_Age_15 = 158 | -1.594 |
| | (0.0195) |
| Father_Report_Ind_Age_15 = 168 | -0.957 |
| | (0.0236) |
| Father_Report_Ind_Age_15 = 177 | -1.296 |
| | (0.0188) |
| Father_Report_Ind_Age_15 = 178 | -0.999 |
| | (0.0202) |
| Father_Report_Ind_Age_15 = 179 | -0.968 |
| | (0.0190) |
| Father_Report_Ind_Age_15 = 187, omitted | - |

| | |
|---|---|
| Father_Report_Ind_Age_15 = 188 | -1.220 |
| | (0.0189) |
| Father_Report_Ind_Age_15 = 189 | -1.371 |
| | (0.0180) |
| Father_Report_Ind_Age_15 = 197 | -1.327 |
| | (0.0192) |
| Father_Report_Ind_Age_15 = 198 | -1.179 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 199, omitted | - |
| Father_Report_Ind_Age_15 = 207 | -1.639 |
| | (0.0230) |
| Father_Report_Ind_Age_15 = 208 | -1.370 |
| | (0.0179) |
| Father_Report_Ind_Age_15 = 209 | -1.260 |
| | (0.0230) |
| Father_Report_Ind_Age_15 = 219 | -1.471 |
| | (0.0179) |
| Father_Report_Ind_Age_15 = 227 | -1.051 |
| | (0.0180) |
| Father_Report_Ind_Age_15 = 228 | -1.470 |
| | (0.0198) |
| Father_Report_Ind_Age_15 = 229 | -0.822 |
| | (0.0245) |
| Father_Report_Ind_Age_15 = 237 | -1.073 |
| | (0.0289) |
| Father_Report_Ind_Age_15 = 247 | -1.084 |
| | (0.0210) |
| Father_Report_Ind_Age_15 = 258 | -1.515 |
| | (0.0280) |
| Father_Report_Ind_Age_15 = 259 | -1.745 |
| | (0.0240) |
| Father_Report_Ind_Age_15 = 268 | -1.367 |
| | (0.0184) |
| Father_Report_Ind_Age_15 = 269 | -1.449 |
| | (0.0287) |
| Father_Report_Ind_Age_15 = 287 | -1.423 |
| | (0.0213) |
| Father_Report_Ind_Age_15 = 289 | -1.413 |
| | (0.0228) |
| Father_Report_Ind_Age_15 = 307, omitted | - |
| Father_Report_Ind_Age_15 = 317 | -1.706 |
| | (0.0205) |
| Father_Report_Ind_Age_15 = 319 | -1.534 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 327 | -1.368 |
| | (0.0239) |
| Father_Report_Ind_Age_15 = 328 | -1.253 |
| | (0.0208) |
| Father_Report_Ind_Age_15 = 329 | -0.888 |
| | (0.0279) |
| Father_Report_Ind_Age_15 = 337 | -1.405 |
| | (0.0235) |
| Father_Report_Ind_Age_15 = 338 | -0.921 |
| | (0.0201) |
| Father_Report_Ind_Age_15 = 339 | -1.075 |
| | (0.0182) |
| Father_Report_Ind_Age_15 = 347 | -1.205 |
| | (0.0209) |

| | |
|---|---|
| Father_Report_Ind_Age_15 = 348 | -1.718 |
| | (0.0229) |
| Father_Report_Ind_Age_15 = 357 | -1.063 |
| | (0.0311) |
| Father_Report_Ind_Age_15 = 358 | -1.444 |
| | (0.0226) |
| Father_Report_Ind_Age_15 = 359 | -1.786 |
| | (0.0230) |
| Father_Report_Ind_Age_15 = 368 | -1.159 |
| | (0.0231) |
| Father_Report_Ind_Age_15 = 369 | -1.223 |
| | (0.0222) |
| Father_Report_Ind_Age_15 = 377 | -1.175 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 379 | -1.288 |
| | (0.0190) |
| Father_Report_Ind_Age_15 = 387 | -1.725 |
| | (0.0217) |
| Father_Report_Ind_Age_15 = 388 | -2.246 |
| | (0.0243) |
| Father_Report_Ind_Age_15 = 389 | -2.058 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 398 | -0.620 |
| | (0.0296) |
| Father_Report_Ind_Age_15 = 407 | -1.496 |
| | (0.0201) |
| Father_Report_Ind_Age_15 = 408 | -2.005 |
| | (0.0278) |
| Father_Report_Ind_Age_15 = 417 | -1.035 |
| | (0.0172) |
| Father_Report_Ind_Age_15 = 427 | -0.892 |
| | (0.0187) |
| Father_Report_Ind_Age_15 = 447 | -2.051 |
| | (0.0217) |
| Father_Report_Ind_Age_15 = 448 | -1.033 |
| | (0.0190) |
| Father_Report_Ind_Age_15 = 467 | -1.185 |
| | (0.0195) |
| Father_Report_Ind_Age_15 = 468 | -1.100 |
| | (0.0282) |
| Father_Report_Ind_Age_15 = 469 | -1.684 |
| | (0.0241) |
| Father_Report_Ind_Age_15 = 477 | -1.552 |
| | (0.0272) |
| Father_Report_Ind_Age_15 = 478 | -1.851 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 479 | -1.592 |
| | (0.0356) |
| Father_Report_Ind_Age_15 = 507 | -1.050 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 508 | -1.522 |
| | (0.0239) |
| Father_Report_Ind_Age_15 = 509 | -1.382 |
| | (0.0271) |
| Father_Report_Ind_Age_15 = 527 | -1.444 |
| | (0.0187) |
| Father_Report_Ind_Age_15 = 528 | -0.845 |
| | (0.0213) |
| Father_Report_Ind_Age_15 = 529 | -2.892 |
| | (0.0212) |

| | |
|---|---|
| Father_Report_Ind_Age_15 = 537 | -1.151 |
| | (0.0208) |
| Father_Report_Ind_Age_15 = 538 | -1.839 |
| | (0.0280) |
| Father_Report_Ind_Age_15 = 539 | -1.412 |
| | (0.0188) |
| Father_Report_Ind_Age_15 = 558 | 0.103 |
| | (0.0289) |
| Father_Report_Ind_Age_15 = 559 | -0.797 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 567 | -1.228 |
| | (0.0221) |
| Father_Report_Ind_Age_15 = 568 | -1.042 |
| | (0.0204) |
| Father_Report_Ind_Age_15 = 569 | -0.972 |
| | (0.0247) |
| Father_Report_Ind_Age_15 = 587 | -1.171 |
| | (0.0193) |
| Father_Report_Ind_Age_15 = 588 | -1.639 |
| | (0.0293) |
| Father_Report_Ind_Age_15 = 607 | -1.031 |
| | (0.0202) |
| Father_Report_Ind_Age_15 = 609 | -1.166 |
| | (0.0239) |
| Father_Report_Ind_Age_15 = 617 | -0.406 |
| | (0.0281) |
| Father_Report_Ind_Age_15 = 618 | -1.887 |
| | (0.0228) |
| Father_Report_Ind_Age_15 = 627 | -1.311 |
| | (0.0273) |
| Father_Report_Ind_Age_15 = 628 | -1.583 |
| | (0.0179) |
| Father_Report_Ind_Age_15 = 637 | -2.151 |
| | (0.0246) |
| Father_Report_Ind_Age_15 = 638 | -2.134 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 639 | -1.358 |
| | (0.0185) |
| Father_Report_Ind_Age_15 = 648 | -2.129 |
| | (0.0242) |
| Father_Report_Ind_Age_15 = 649 | -1.144 |
| | (0.0197) |
| Father_Report_Ind_Age_15 = 657 | -1.251 |
| | (0.0272) |
| Father_Report_Ind_Age_15 = 658 | -2.290 |
| | (0.0231) |
| Father_Report_Ind_Age_15 = 667, omitted | - |
| Father_Report_Ind_Age_15 = 668 | -1.527 |
| | (0.0204) |
| Father_Report_Ind_Age_15 = 669 | -2.971 |
| | (0.0276) |
| Father_Report_Ind_Age_15 = 677 | -1.954 |
| | (0.0294) |
| Father_Report_Ind_Age_15 = 678 | -1.973 |
| | (0.0272) |
| Father_Report_Ind_Age_15 = 679 | -1.922 |
| | (0.0222) |
| Father_Report_Ind_Age_15 = 689 | -1.256 |
| | (0.0267) |

| | |
|---|---|
| Father_Report_Ind_Age_15 = 697 | -1.491 |
| | (0.0224) |
| Father_Report_Ind_Age_15 = 698 | -0.406 |
| | (0.0275) |
| Father_Report_Ind_Age_15 = 707 | -1.404 |
| | (0.0218) |
| Father_Report_Ind_Age_15 = 708 | -1.565 |
| | (0.0243) |
| Father_Report_Ind_Age_15 = 709 | -1.379 |
| | (0.0270) |
| Father_Report_Ind_Age_15 = 717 | -0.919 |
| | (0.0187) |
| Father_Report_Ind_Age_15 = 718 | -1.523 |
| | (0.0189) |
| Father_Report_Ind_Age_15 = 728 | -1.336 |
| | (0.0277) |
| Father_Report_Ind_Age_15 = 738 | -1.075 |
| | (0.0348) |
| Father_Report_Ind_Age_15 = 739 | -1.225 |
| | (0.0214) |
| Father_Report_Ind_Age_15 = 747 | -1.214 |
| | (0.0287) |
| Father_Report_Ind_Age_15 = 748 | -1.910 |
| | (0.0225) |
| Father_Report_Ind_Age_15 = 757 | -1.867 |
| | (0.0190) |
| Father_Report_Ind_Age_15 = 758 | -1.021 |
| | (0.0302) |
| Father_Report_Ind_Age_15 = 759 | -1.194 |
| | (0.0217) |
| Father_Report_Ind_Age_15 = 777 | -3.727 |
| | (0.0383) |
| Father_Report_Ind_Age_15 = 778 | -1.789 |
| | (0.0219) |
| Father_Report_Ind_Age_15 = 779 | -1.765 |
| | (0.0186) |
| Father_Report_Ind_Age_15 = 798, omitted | - |
| Father_Report_Ind_Age_15 = 807, omitted | - |
| Father_Report_Ind_Age_15 = 809 | -0.998 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 828 | -1.239 |
| | (0.0229) |
| Father_Report_Ind_Age_15 = 829, omitted | - |
| Father_Report_Ind_Age_15 = 838 | -1.673 |
| | (0.0181) |
| Father_Report_Ind_Age_15 = 839 | -1.249 |
| | (0.0307) |
| Father_Report_Ind_Age_15 = 847, omitted | - |
| Father_Report_Ind_Age_15 = 848 | -1.180 |
| | (0.0201) |
| Father_Report_Ind_Age_15 = 849 | -1.038 |
| | (0.0261) |
| Father_Report_Ind_Age_15 = 857 | -1.986 |
| | (0.0194) |
| Father_Report_Ind_Age_15 = 858 | -1.380 |
| | (0.0178) |

| | |
|---|---|
| Father_Report_Ind_Age_15 = 867 | -1.510 |
| | (0.0272) |
| Father_Report_Ind_Age_15 = 868 | -1.674 |
| | (0.0274) |
| Father_Report_Ind_Age_15 = 869 | -0.975 |
| | (0.0296) |
| Father_Report_Ind_Age_15 = 877 | -1.656 |
| | (0.0198) |
| Father_Report_Ind_Age_15 = 878 | -1.115 |
| | (0.0275) |
| Father_Report_Ind_Age_15 = 879 | -1.603 |
| | (0.0275) |
| Father_Report_Ind_Age_15 = 887 | -2.249 |
| | (0.0222) |
| Father_Report_Ind_Age_15 = 888 | -1.131 |
| | (0.0187) |
| Father_Report_Ind_Age_15 = 889 | -1.368 |
| | (0.0204) |
| Father_Report_Ind_Age_15 = 897 | -1.075 |
| | (0.0461) |
| Father_Report_Ind_Age_15 = 907 | -0.787 |
| | (0.0232) |
| Father_Report_Ind_Age_15 = 917 | -1.193 |
| | (0.0177) |
| Father_Report_Ind_Age_15 = 927 | -1.401 |
| | (0.0184) |
| Father_Report_Ind_Age_15 = 937 | -1.256 |
| | (0.0188) |
| Father_Report_Ind_Age_15 = 999 | -1.760 |
| | (0.0192) |
| Father_Age10_Dummies = 1 | -0.792 |
| | (0.00424) |
| Father_Age10_Dummies = 2 | -0.515 |
| | (0.00364) |
| Father_Age10_Dummies = 3 | -0.259 |
| | (0.00355) |
| Father_Age10_Dummies = 4 | -0.199 |
| | (0.00378) |
| Father_Age10_Dummies = 6 | -0.0878 |
| | (0.00388) |
| Father_Age10_Dummies = 7 | -0.288 |
| | (0.00378) |
| Father_Age10_Dummies = 8 | 0.0706 |
| | (0.00461) |
| Father_Age10_Dummies = 9 | -0.975 |
| | (0.00618) |
| Constant | 10.16 |
| | (0.00908) |
| Observations | 498,987 |
| R-squared | 0.599 |

**<u>Model M5c</u>. Time-average earnings as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.241 |
| | (0.00169) |
| Father_Race = 3, American Indian | -0.454 |
| | (0.00678) |
| Father_Race = 4, Asian | -0.0688 |
| | (0.0106) |
| Father_Race = 5, Pacific Islander | -0.348 |
| | (0.0177) |
| Father_Race = 7, Other / Unknown | -0.0302 |
| | (0.00281) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | -0.223 |
| | (0.00882) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | -0.104 |
| | (0.00805) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.00829 |
| | (0.00803) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.108 |
| | (0.00789) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.142 |
| | (0.00794) |
| Child_Report_Father_Ed = 6, College degree | 0.501 |
| | (0.00803) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.699 |
| | (0.00814) |
| Child_Report_Father_Ed = 10, 10 | 0.700 |
| | (0.00992) |
| Child_Report_Father_Occ_1970 = 2 | 0.388 |
| | (0.0160) |
| Child_Report_Father_Occ_1970 = 3 | -0.245 |
| | (0.00941) |
| Child_Report_Father_Occ_1970 = 4 | -0.135 |
| | (0.0111) |
| Child_Report_Father_Occ_1970 = 5 | -0.149 |
| | (0.00989) |
| Child_Report_Father_Occ_1970 = 6 | -0.287 |

| | |
|---|---|
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 10 | -0.415 |
| | (0.00879) |
| Child_Report_Father_Occ_1970 = 11 | -0.0859 |
| | (0.00994) |
| Child_Report_Father_Occ_1970 = 12 | -0.0252 |
| | (0.00740) |
| Child_Report_Father_Occ_1970 = 13 | -0.0224 |
| | (0.0135) |
| Child_Report_Father_Occ_1970 = 14 | -0.142 |
| | (0.00637) |
| Child_Report_Father_Occ_1970 = 23 | 0.204 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 24 | 0.497 |
| | (0.0118) |
| Child_Report_Father_Occ_1970 = 31 | 0.251 |
| | (0.00681) |
| Child_Report_Father_Occ_1970 = 45 | -0.0694 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 53 | 0.201 |
| | (0.0142) |
| Child_Report_Father_Occ_1970 = 55 | -0.155 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 56 | -0.0434 |
| | (0.0103) |
| Child_Report_Father_Occ_1970 = 62 | -0.266 |
| | (0.0102) |
| Child_Report_Father_Occ_1970 = 64 | 0.409 |
| | (0.0170) |
| Child_Report_Father_Occ_1970 = 65 | -0.159 |
| | (0.00686) |
| Child_Report_Father_Occ_1970 = 80 | -0.386 |
| | (0.0168) |
| Child_Report_Father_Occ_1970 = 85 | -0.309 |
| | (0.0120) |
| Child_Report_Father_Occ_1970 = 86 | -0.182 |
| | (0.00694) |
| Child_Report_Father_Occ_1970 = 93 | -0.215 |
| | (0.0166) |
| Child_Report_Father_Occ_1970 = 100 | 0.413 |
| | (0.0166) |
| Child_Report_Father_Occ_1970 = 111 | 0.207 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 112 | -0.0666 |
| | (0.0169) |
| Child_Report_Father_Occ_1970 = 123 | 0.615 |
| | (0.0167) |
| Child_Report_Father_Occ_1970 = 126 | -0.177 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 140 | 0.165 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 142 | -0.0899 |
| | (0.0118) |
| Child_Report_Father_Occ_1970 = 144 | -0.0156 |
| | (0.00733) |
| Child_Report_Father_Occ_1970 = 145 | 0.00280 |
| | (0.0162) |
| Child_Report_Father_Occ_1970 = 150 | -0.337 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 152 | -0.0914 |

| | |
|---|---|
| | (0.00899) |
| Child_Report_Father_Occ_1970 = 153 | -0.0322 |
| | (0.0124) |
| Child_Report_Father_Occ_1970 = 163 | 0.423 |
| | (0.0172) |
| Child_Report_Father_Occ_1970 = 174 | -0.517 |
| | (0.0167) |
| Child_Report_Father_Occ_1970 = 183 | 0.558 |
| | (0.0154) |
| Child_Report_Father_Occ_1970 = 184 | -0.384 |
| | (0.0174) |
| Child_Report_Father_Occ_1970 = 185 | 0.129 |
| | (0.0192) |
| Child_Report_Father_Occ_1970 = 190 | -0.384 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 191 | -0.0592 |
| | (0.0158) |
| Child_Report_Father_Occ_1970 = 192 | -0.316 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 195 | -0.0725 |
| | (0.0155) |
| Child_Report_Father_Occ_1970 = 202 | 0.00449 |
| | (0.00698) |
| Child_Report_Father_Occ_1970 = 203 | 0.424 |
| | (0.0155) |
| Child_Report_Father_Occ_1970 = 211 | 0.0445 |
| | (0.0151) |
| Child_Report_Father_Occ_1970 = 212 | -0.243 |
| | (0.0177) |
| Child_Report_Father_Occ_1970 = 215 | 0.265 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 220 | -0.313 |
| | (0.00963) |
| Child_Report_Father_Occ_1970 = 222 | -0.167 |
| | (0.00897) |
| Child_Report_Father_Occ_1970 = 225 | -0.289 |
| | (0.0107) |
| Child_Report_Father_Occ_1970 = 226 | 0.418 |
| | (0.0168) |
| Child_Report_Father_Occ_1970 = 230 | -0.346 |
| | (0.00927) |
| Child_Report_Father_Occ_1970 = 233 | 0.0569 |
| | (0.00892) |
| Child_Report_Father_Occ_1970 = 235 | 0.102 |
| | (0.0172) |
| Child_Report_Father_Occ_1970 = 240 | 0.0223 |
| | (0.00772) |
| Child_Report_Father_Occ_1970 = 245 | -0.0673 |
| | (0.00438) |
| Child_Report_Father_Occ_1970 = 265 | -0.317 |
| | (0.00645) |
| Child_Report_Father_Occ_1970 = 270 | -0.103 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 281 | 0.269 |
| | (0.00721) |
| Child_Report_Father_Occ_1970 = 282 | 0.118 |
| | (0.00629) |
| Child_Report_Father_Occ_1970 = 283 | -0.00902 |
| | (0.00630) |
| Child_Report_Father_Occ_1970 = 284 | -0.00708 |

| | |
|---|---|
| | (0.00713) |
| Child_Report_Father_Occ_1970 = 285 | 0.0434 |
| | (0.0120) |
| Child_Report_Father_Occ_1970 = 301 | 0.131 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 305 | 0.0411 |
| | (0.0188) |
| Child_Report_Father_Occ_1970 = 310 | 0.126 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 312 | -0.245 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 321 | 0.259 |
| | (0.0160) |
| Child_Report_Father_Occ_1970 = 326 | -0.181 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 331 | -0.107 |
| | (0.00687) |
| Child_Report_Father_Occ_1970 = 332 | -0.00846 |
| | (0.0160) |
| Child_Report_Father_Occ_1970 = 333 | 0.505 |
| | (0.0150) |
| Child_Report_Father_Occ_1970 = 343 | 0.483 |
| | (0.0221) |
| Child_Report_Father_Occ_1970 = 361 | -0.308 |
| | (0.0132) |
| Child_Report_Father_Occ_1970 = 363 | -0.271 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 374 | -0.0839 |
| | (0.00907) |
| Child_Report_Father_Occ_1970 = 381 | 0.0936 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 390 | -0.0466 |
| | (0.0134) |
| Child_Report_Father_Occ_1970 = 410 | -0.412 |
| | (0.00861) |
| Child_Report_Father_Occ_1970 = 412 | -0.544 |
| | (0.00933) |
| Child_Report_Father_Occ_1970 = 413 | -0.147 |
| | (0.0194) |
| Child_Report_Father_Occ_1970 = 415 | -0.0418 |
| | (0.00528) |
| Child_Report_Father_Occ_1970 = 420 | -0.476 |
| | (0.0172) |
| Child_Report_Father_Occ_1970 = 422 | 0.459 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 424 | 0.0715 |
| | (0.00913) |
| Child_Report_Father_Occ_1970 = 426 | 0.389 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 430 | -0.331 |
| | (0.00817) |
| Child_Report_Father_Occ_1970 = 433 | 0.0282 |
| | (0.00822) |
| Child_Report_Father_Occ_1970 = 436 | -0.528 |
| | (0.00880) |
| Child_Report_Father_Occ_1970 = 441 | -0.152 |
| | (0.00572) |
| Child_Report_Father_Occ_1970 = 452 | 0.335 |
| | (0.0153) |
| Child_Report_Father_Occ_1970 = 454 | -0.355 |

| | |
|---|---|
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 455 | -0.265 |
| | (0.0119) |
| Child_Report_Father_Occ_1970 = 461 | -0.272 |
| | (0.00603) |
| Child_Report_Father_Occ_1970 = 470 | 0.103 |
| | (0.00965) |
| Child_Report_Father_Occ_1970 = 471 | -0.491 |
| | (0.0118) |
| Child_Report_Father_Occ_1970 = 472 | -0.152 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 473 | -0.133 |
| | (0.00526) |
| Child_Report_Father_Occ_1970 = 475 | 0.170 |
| | (0.0171) |
| Child_Report_Father_Occ_1970 = 480 | -1.926 |
| | (0.0136) |
| Child_Report_Father_Occ_1970 = 481 | 0.148 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 482 | -0.244 |
| | (0.0123) |
| Child_Report_Father_Occ_1970 = 483 | 0.130 |
| | (0.0196) |
| Child_Report_Father_Occ_1970 = 484 | -0.311 |
| | (0.0193) |
| Child_Report_Father_Occ_1970 = 485 | -0.537 |
| | (0.0221) |
| Child_Report_Father_Occ_1970 = 492 | -0.932 |
| | (0.0217) |
| Child_Report_Father_Occ_1970 = 495 | -0.625 |
| | (0.0171) |
| Child_Report_Father_Occ_1970 = 502 | -0.0958 |
| | (0.00841) |
| Child_Report_Father_Occ_1970 = 510 | -0.539 |
| | (0.0121) |
| Child_Report_Father_Occ_1970 = 516 | -0.266 |
| | (0.0148) |
| Child_Report_Father_Occ_1970 = 522 | -0.258 |
| | (0.00708) |
| Child_Report_Father_Occ_1970 = 530 | -0.111 |
| | (0.00893) |
| Child_Report_Father_Occ_1970 = 534 | -0.482 |
| | (0.0121) |
| Child_Report_Father_Occ_1970 = 535 | 0.0544 |
| | (0.0172) |
| Child_Report_Father_Occ_1970 = 540 | 0.260 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 542 | 0.651 |
| | (0.0168) |
| Child_Report_Father_Occ_1970 = 545 | -0.666 |
| | (0.0125) |
| Child_Report_Father_Occ_1970 = 551 | -0.0383 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 554 | 0.233 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 561 | 0.668 |
| | (0.0137) |
| Child_Report_Father_Occ_1970 = 563 | -0.149 |
| | (0.0102) |
| Child_Report_Father_Occ_1970 = 575 | -0.315 |

| | |
|---|---|
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 600 | -0.0993 |
| | (0.00484) |
| Child_Report_Father_Occ_1970 = 602 | -0.146 |
| | (0.00622) |
| Child_Report_Father_Occ_1970 = 604 | -0.619 |
| | (0.0168) |
| Child_Report_Father_Occ_1970 = 610 | -0.167 |
| | (0.0125) |
| Child_Report_Father_Occ_1970 = 611 | 0.189 |
| | (0.0135) |
| Child_Report_Father_Occ_1970 = 614 | -0.594 |
| | (0.0200) |
| Child_Report_Father_Occ_1970 = 615 | 0.126 |
| | (0.0149) |
| Child_Report_Father_Occ_1970 = 622 | -0.399 |
| | (0.0199) |
| Child_Report_Father_Occ_1970 = 623 | -0.427 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 630 | 0.250 |
| | (0.0178) |
| Child_Report_Father_Occ_1970 = 631 | -0.127 |
| | (0.0102) |
| Child_Report_Father_Occ_1970 = 633 | 0.0156 |
| | (0.00908) |
| Child_Report_Father_Occ_1970 = 640 | -0.213 |
| | (0.00729) |
| Child_Report_Father_Occ_1970 = 642 | 0.0917 |
| | (0.0154) |
| Child_Report_Father_Occ_1970 = 643 | -0.683 |
| | (0.0161) |
| Child_Report_Father_Occ_1970 = 644 | 0.211 |
| | (0.0124) |
| Child_Report_Father_Occ_1970 = 645 | 0.129 |
| | (0.0169) |
| Child_Report_Father_Occ_1970 = 653 | 0.0347 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 662 | -0.190 |
| | (0.0130) |
| Child_Report_Father_Occ_1970 = 666 | -0.498 |
| | (0.0252) |
| Child_Report_Father_Occ_1970 = 673 | 0.0484 |
| | (0.0165) |
| Child_Report_Father_Occ_1970 = 674 | 0.572 |
| | (0.0162) |
| Child_Report_Father_Occ_1970 = 680 | -0.356 |
| | (0.00636) |
| Child_Report_Father_Occ_1970 = 690 | -0.293 |
| | (0.00811) |
| Child_Report_Father_Occ_1970 = 692 | -0.225 |
| | (0.00755) |
| Child_Report_Father_Occ_1970 = 694 | -0.0868 |
| | (0.00807) |
| Child_Report_Father_Occ_1970 = 695 | -0.138 |
| | (0.00515) |
| Child_Report_Father_Occ_1970 = 703 | -0.282 |
| | (0.00891) |
| Child_Report_Father_Occ_1970 = 705 | -0.138 |
| | (0.00685) |
| Child_Report_Father_Occ_1970 = 706 | -0.0507 |

| | |
|---|---|
| | (0.0104) |
| Child_Report_Father_Occ_1970 = 714 | 0.634 |
| | (0.0185) |
| Child_Report_Father_Occ_1970 = 715 | -0.0988 |
| | (0.00476) |
| Child_Report_Father_Occ_1970 = 751 | -0.137 |
| | (0.00550) |
| Child_Report_Father_Occ_1970 = 752 | -0.241 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 753 | -0.197 |
| | (0.00754) |
| Child_Report_Father_Occ_1970 = 755 | -0.587 |
| | (0.00732) |
| Child_Report_Father_Occ_1970 = 760 | -1.233 |
| | (0.0176) |
| Child_Report_Father_Occ_1970 = 761 | -0.282 |
| | (0.00722) |
| Child_Report_Father_Occ_1970 = 762 | -0.494 |
| | (0.0178) |
| Child_Report_Father_Occ_1970 = 763 | -0.0699 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 770 | -0.359 |
| | (0.0170) |
| Child_Report_Father_Occ_1970 = 780 | -0.192 |
| | (0.00700) |
| Child_Report_Father_Occ_1970 = 785 | 0.0861 |
| | (0.00751) |
| Child_Report_Father_Occ_1970 = 801 | -0.108 |
| | (0.00464) |
| Child_Report_Father_Occ_1970 = 802 | 0.0503 |
| | (0.0164) |
| Child_Report_Father_Occ_1970 = 821 | -0.0942 |
| | (0.0165) |
| Child_Report_Father_Occ_1970 = 822 | -0.335 |
| | (0.00620) |
| Child_Report_Father_Occ_1970 = 902 | -0.320 |
| | (0.0158) |
| Child_Report_Father_Occ_1970 = 903 | -0.120 |
| | (0.00593) |
| Child_Report_Father_Occ_1970 = 910 | -0.0920 |
| | (0.0173) |
| Child_Report_Father_Occ_1970 = 912 | 0.0201 |
| | (0.0160) |
| Child_Report_Father_Occ_1970 = 925 | -0.0718 |
| | (0.0104) |
| Child_Report_Father_Occ_1970 = 961 | 0.0223 |
| | (0.00703) |
| Child_Report_Father_Occ_1970 = 962 | -0.304 |
| | (0.00698) |
| Child_Report_Father_Occ_1970 = 964 | -0.0965 |
| | (0.00666) |
| Child_Report_Father_Ind = 19 | 0.453 |
| | (0.0116) |
| Child_Report_Father_Ind = 27 | 0.459 |
| | (0.0138) |
| Child_Report_Father_Ind = 47 | 0.730 |
| | (0.0118) |
| Child_Report_Father_Ind = 48 | 0.577 |
| | (0.00674) |
| Child_Report_Father_Ind = 49 | 0.556 |

| | |
|---|---|
| | (0.0125) |
| Child_Report_Father_Ind = 57 | 0.523 |
| | (0.0114) |
| Child_Report_Father_Ind = 67 | 0.337 |
| | (0.00339) |
| Child_Report_Father_Ind = 68 | 0.287 |
| | (0.00439) |
| Child_Report_Father_Ind = 69 | 0.461 |
| | (0.00360) |
| Child_Report_Father_Ind = 77 | 0.496 |
| | (0.00638) |
| Child_Report_Father_Ind = 107 | 0.304 |
| | (0.00514) |
| Child_Report_Father_Ind = 108 | 0.410 |
| | (0.00515) |
| Child_Report_Father_Ind = 118 | 0.452 |
| | (0.00654) |
| Child_Report_Father_Ind = 119 | 0.337 |
| | (0.0110) |
| Child_Report_Father_Ind = 127 | -0.208 |
| | (0.00996) |
| Child_Report_Father_Ind = 138 | 0.270 |
| | (0.0155) |
| Child_Report_Father_Ind = 139 | 0.818 |
| | (0.0119) |
| Child_Report_Father_Ind = 147 | 0.351 |
| | (0.00868) |
| Child_Report_Father_Ind = 148 | 0.113 |
| | (0.0158) |
| Child_Report_Father_Ind = 149 | 0.665 |
| | (0.0196) |
| Child_Report_Father_Ind = 157 | 0.814 |
| | (0.0181) |
| Child_Report_Father_Ind = 158 | 0.437 |
| | (0.0119) |
| Child_Report_Father_Ind = 168 | -0.252 |
| | (0.0137) |
| Child_Report_Father_Ind = 169 | 0.475 |
| | (0.0122) |
| Child_Report_Father_Ind = 177 | 0.664 |
| | (0.00849) |
| Child_Report_Father_Ind = 178 | 0.626 |
| | (0.00726) |
| Child_Report_Father_Ind = 179 | 0.215 |
| | (0.00959) |
| Child_Report_Father_Ind = 187 | 0.503 |
| | (0.0115) |
| Child_Report_Father_Ind = 188 | 0.629 |
| | (0.00875) |
| Child_Report_Father_Ind = 189 | 0.336 |
| | (0.00970) |
| Child_Report_Father_Ind = 197 | 0.386 |
| | (0.00558) |
| Child_Report_Father_Ind = 198 | 0.293 |
| | (0.0158) |
| Child_Report_Father_Ind = 199 | 0.375 |
| | (0.00722) |
| Child_Report_Father_Ind = 207 | 0.626 |
| | (0.0155) |
| Child_Report_Father_Ind = 208 | 0.504 |

| | |
|---|---|
| | (0.00677) |
| Child_Report_Father_Ind = 209 | 0.706 |
| | (0.00779) |
| Child_Report_Father_Ind = 219 | 0.680 |
| | (0.00416) |
| Child_Report_Father_Ind = 227 | 0.722 |
| | (0.00537) |
| Child_Report_Father_Ind = 228 | 0.341 |
| | (0.00797) |
| Child_Report_Father_Ind = 237 | 0.404 |
| | (0.0169) |
| Child_Report_Father_Ind = 247, omitted | - |
| Child_Report_Father_Ind = 248 | 0.188 |
| | (0.0192) |
| Child_Report_Father_Ind = 258 | 0.418 |
| | (0.0162) |
| Child_Report_Father_Ind = 259 | 0.375 |
| | (0.0203) |
| Child_Report_Father_Ind = 268 | 0.774 |
| | (0.00488) |
| Child_Report_Father_Ind = 269 | 0.267 |
| | (0.00924) |
| Child_Report_Father_Ind = 287 | 0.209 |
| | (0.00763) |
| Child_Report_Father_Ind = 289 | 0.377 |
| | (0.00623) |
| Child_Report_Father_Ind = 317 | 0.187 |
| | (0.00698) |
| Child_Report_Father_Ind = 319 | 0.508 |
| | (0.00850) |
| Child_Report_Father_Ind = 327 | 0.470 |
| | (0.0157) |
| Child_Report_Father_Ind = 328 | 0.636 |
| | (0.00693) |
| Child_Report_Father_Ind = 337 | 0.129 |
| | (0.00954) |
| Child_Report_Father_Ind = 338 | 1.198 |
| | (0.00641) |
| Child_Report_Father_Ind = 339 | 0.716 |
| | (0.00697) |
| Child_Report_Father_Ind = 347 | 0.185 |
| | (0.0158) |
| Child_Report_Father_Ind = 357 | 0.435 |
| | (0.0105) |
| Child_Report_Father_Ind = 358 | 0.402 |
| | (0.00801) |
| Child_Report_Father_Ind = 359 | 0.502 |
| | (0.0195) |
| Child_Report_Father_Ind = 367 | 0.475 |
| | (0.0167) |
| Child_Report_Father_Ind = 369 | 0.437 |
| | (0.00993) |
| Child_Report_Father_Ind = 377 | 0.917 |
| | (0.0119) |
| Child_Report_Father_Ind = 379 | 0.553 |
| | (0.00655) |
| Child_Report_Father_Ind = 387 | 0.256 |
| | (0.0114) |
| Child_Report_Father_Ind = 388 | 0.329 |

| | |
|---|---|
| | (0.0118) |
| Child_Report_Father_Ind = 389 | -0.342 |
| | (0.00928) |
| Child_Report_Father_Ind = 398 | 0.482 |
| | (0.00468) |
| Child_Report_Father_Ind = 407 | 0.465 |
| | (0.00531) |
| Child_Report_Father_Ind = 408 | 0.272 |
| | (0.00797) |
| Child_Report_Father_Ind = 409 | 0.129 |
| | (0.0239) |
| Child_Report_Father_Ind = 417 | 0.480 |
| | (0.00367) |
| Child_Report_Father_Ind = 419 | -0.0987 |
| | (0.0182) |
| Child_Report_Father_Ind = 427 | 0.675 |
| | (0.0122) |
| Child_Report_Father_Ind = 429 | 0.775 |
| | (0.0154) |
| Child_Report_Father_Ind = 447 | 0.685 |
| | (0.0153) |
| Child_Report_Father_Ind = 448 | 0.698 |
| | (0.00528) |
| Child_Report_Father_Ind = 449 | 0.223 |
| | (0.0133) |
| Child_Report_Father_Ind = 467 | 0.633 |
| | (0.00533) |
| Child_Report_Father_Ind = 468 | 0.942 |
| | (0.0155) |
| Child_Report_Father_Ind = 469 | 0.148 |
| | (0.0167) |
| Child_Report_Father_Ind = 477 | 0.0174 |
| | (0.00935) |
| Child_Report_Father_Ind = 478 | 0.461 |
| | (0.00972) |
| Child_Report_Father_Ind = 479 | 0.152 |
| | (0.0157) |
| Child_Report_Father_Ind = 507 | 0.284 |
| | (0.0158) |
| Child_Report_Father_Ind = 508 | 0.908 |
| | (0.0129) |
| Child_Report_Father_Ind = 509 | 1.013 |
| | (0.0158) |
| Child_Report_Father_Ind = 527 | 0.628 |
| | (0.00964) |
| Child_Report_Father_Ind = 528 | 0.273 |
| | (0.0151) |
| Child_Report_Father_Ind = 529 | -0.273 |
| | (0.0167) |
| Child_Report_Father_Ind = 539 | 0.436 |
| | (0.0130) |
| Child_Report_Father_Ind = 558 | 0.559 |
| | (0.0105) |
| Child_Report_Father_Ind = 559 | -0.137 |
| | (0.00927) |
| Child_Report_Father_Ind = 567 | 0.416 |
| | (0.0121) |
| Child_Report_Father_Ind = 569 | 0.508 |
| | (0.00682) |
| Child_Report_Father_Ind = 587 | 0.753 |

| | |
|---|---|
| | (0.00695) |
| Child_Report_Father_Ind = 588 | 1.462 |
| | (0.0171) |
| Child_Report_Father_Ind = 607 | 0.393 |
| | (0.00978) |
| Child_Report_Father_Ind = 608 | 0.208 |
| | (0.00690) |
| Child_Report_Father_Ind = 609 | 0.557 |
| | (0.00943) |
| Child_Report_Father_Ind = 617 | 0.774 |
| | (0.0122) |
| Child_Report_Father_Ind = 618 | -0.400 |
| | (0.0160) |
| Child_Report_Father_Ind = 627 | 0.0911 |
| | (0.0162) |
| Child_Report_Father_Ind = 628 | 0.380 |
| | (0.00463) |
| Child_Report_Father_Ind = 637 | -0.0747 |
| | (0.0182) |
| Child_Report_Father_Ind = 638 | 0.343 |
| | (0.0107) |
| Child_Report_Father_Ind = 639 | 0.557 |
| | (0.00648) |
| Child_Report_Father_Ind = 647 | 0.214 |
| | (0.0124) |
| Child_Report_Father_Ind = 648 | 0.0737 |
| | (0.0112) |
| Child_Report_Father_Ind = 649 | 0.351 |
| | (0.0113) |
| Child_Report_Father_Ind = 657 | 0.669 |
| | (0.0105) |
| Child_Report_Father_Ind = 658 | 0.0543 |
| | (0.0169) |
| Child_Report_Father_Ind = 667 | -0.0736 |
| | (0.0116) |
| Child_Report_Father_Ind = 668 | -0.273 |
| | (0.0161) |
| Child_Report_Father_Ind = 669 | 0.667 |
| | (0.00776) |
| Child_Report_Father_Ind = 677 | 0.00192 |
| | (0.00673) |
| Child_Report_Father_Ind = 679 | -0.0128 |
| | (0.0174) |
| Child_Report_Father_Ind = 688 | -0.0258 |
| | (0.0164) |
| Child_Report_Father_Ind = 689 | 1.017 |
| | (0.0159) |
| Child_Report_Father_Ind = 697 | 0.402 |
| | (0.00723) |
| Child_Report_Father_Ind = 698 | 1.300 |
| | (0.0129) |
| Child_Report_Father_Ind = 707 | 0.283 |
| | (0.00845) |
| Child_Report_Father_Ind = 708 | -0.143 |
| | (0.0122) |
| Child_Report_Father_Ind = 709 | 0.000466 |
| | (0.0133) |
| Child_Report_Father_Ind = 717 | 0.707 |
| | (0.00547) |
| Child_Report_Father_Ind = 718 | 0.541 |

| | |
|---|---|
| | (0.00611) |
| Child_Report_Father_Ind = 727 | 0.711 |
| | (0.00927) |
| Child_Report_Father_Ind = 738 | 0.528 |
| | (0.0167) |
| Child_Report_Father_Ind = 739 | 0.601 |
| | (0.00859) |
| Child_Report_Father_Ind = 748, omitted | - |
| Child_Report_Father_Ind = 749 | 0.563 |
| | (0.0165) |
| Child_Report_Father_Ind = 757 | 0.124 |
| | (0.00365) |
| Child_Report_Father_Ind = 758 | 0.474 |
| | (0.0192) |
| Child_Report_Father_Ind = 759 | 0.242 |
| | (0.0106) |
| Child_Report_Father_Ind = 777 | -0.0852 |
| | (0.0156) |
| Child_Report_Father_Ind = 779 | 0.373 |
| | (0.00720) |
| Child_Report_Father_Ind = 788, omitted | - |
| Child_Report_Father_Ind = 798, omitted | - |
| Child_Report_Father_Ind = 807 | 0.397 |
| | (0.0115) |
| Child_Report_Father_Ind = 809 | -0.312 |
| | (0.0114) |
| Child_Report_Father_Ind = 828 | 1.221 |
| | (0.00947) |
| Child_Report_Father_Ind = 829 | 0.186 |
| | (0.0102) |
| Child_Report_Father_Ind = 838 | 0.237 |
| | (0.00644) |
| Child_Report_Father_Ind = 839 | 0.653 |
| | (0.0155) |
| Child_Report_Father_Ind = 848 | 0.478 |
| | (0.00708) |
| Child_Report_Father_Ind = 849 | 0.368 |
| | (0.0106) |
| Child_Report_Father_Ind = 857 | 0.171 |
| | (0.00386) |
| Child_Report_Father_Ind = 858 | 0.309 |
| | (0.00509) |
| Child_Report_Father_Ind = 867 | -0.139 |
| | (0.0172) |
| Child_Report_Father_Ind = 877 | 0.337 |
| | (0.00567) |
| Child_Report_Father_Ind = 878 | 0.237 |
| | (0.0167) |
| Child_Report_Father_Ind = 887 | 0.243 |
| | (0.0157) |
| Child_Report_Father_Ind = 888 | 0.585 |
| | (0.00569) |
| Child_Report_Father_Ind = 889 | 0.500 |
| | (0.00820) |
| Child_Report_Father_Ind = 897 | 0.0226 |
| | (0.0122) |
| Child_Report_Father_Ind = 907 | 0.346 |

| | |
|---|---|
| | (0.00476) |
| Child_Report_Father_Ind = 917 | 0.428 |
| | (0.00343) |
| Child_Report_Father_Ind = 927 | 0.343 |
| | (0.00688) |
| Child_Report_Father_Ind = 937 | 0.335 |
| | (0.00414) |
| Constant | 10.43 |
| | (0.00892) |
| Observations | 500,000 |
| R-squared | 0.629 |

**<u>Model M5d</u>. Father's earnings in 1980 as the first-stage dependent variable. Sons' recall of father's Z characteristics**

| VARIABLES | Beta (SE) |
|---|---|
| Father_Race = 2, Black | -0.303 |
| | (0.00258) |
| Father_Race = 3, American Indian | -0.514 |
| | (0.0103) |
| Father_Race = 4, Asian | -0.218 |
| | (0.0160) |
| Father_Race = 5, Pacific Islander | 0.127 |
| | (0.0266) |
| Father_Race = 7, Other / Unknown | 0.0410 |
| | (0.00435) |
| Child_Report_Father_Ed = 1, Grades 1 - 5 | 0.0844 |
| | (0.0134) |
| Child_Report_Father_Ed = 2, Grades 6 - 8 | -0.0949 |
| | (0.0121) |
| Child_Report_Father_Ed = 3, Grades 9 - 11 | 0.169 |
| | (0.0122) |
| Child_Report_Father_Ed = 4, Grade 12 (HS completion) | 0.200 |
| | (0.0120) |
| Child_Report_Father_Ed = 5, Some college / associates degree | 0.308 |
| | (0.0121) |
| Child_Report_Father_Ed = 6, College degree | 0.532 |
| | (0.0122) |
| Child_Report_Father_Ed = 7, Advanced college degree | 0.691 |
| | (0.0124) |
| Child_Report_Father_Ed = 10, 10 | 0.124 |
| | (0.0150) |
| Child_Report_Father_Occ_1970 = 2 | 0.776 |
| | (0.0245) |
| Child_Report_Father_Occ_1970 = 3 | -0.0111 |
| | (0.0142) |
| Child_Report_Father_Occ_1970 = 4 | 0.128 |
| | (0.0168) |

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|---|---|
| Child_Report_Father_Occ_1970 = 5 | -0.442 |
| | (0.0150) |
| Child_Report_Father_Occ_1970 = 6 | -0.517 |
| | (0.0158) |
| Child_Report_Father_Occ_1970 = 10 | -0.766 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 11 | -0.338 |
| | (0.0150) |
| Child_Report_Father_Occ_1970 = 12 | -0.507 |
| | (0.0112) |
| Child_Report_Father_Occ_1970 = 13 | 0.176 |
| | (0.0203) |
| Child_Report_Father_Occ_1970 = 14 | -0.0902 |
| | (0.00960) |
| Child_Report_Father_Occ_1970 = 23 | 0.233 |
| | (0.0196) |
| Child_Report_Father_Occ_1970 = 24 | 0.929 |
| | (0.0180) |
| Child_Report_Father_Occ_1970 = 31 | 0.165 |
| | (0.0103) |
| Child_Report_Father_Occ_1970 = 45 | 0.470 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 53 | 0.0787 |
| | (0.0213) |
| Child_Report_Father_Occ_1970 = 55 | -1.581 |
| | (0.0248) |
| Child_Report_Father_Occ_1970 = 56 | 0.0762 |
| | (0.0156) |
| Child_Report_Father_Occ_1970 = 62 | -0.255 |
| | (0.0155) |
| Child_Report_Father_Occ_1970 = 64 | 0.273 |
| | (0.0257) |
| Child_Report_Father_Occ_1970 = 65 | -0.564 |
| | (0.0104) |
| Child_Report_Father_Occ_1970 = 80 | -0.552 |
| | (0.0252) |
| Child_Report_Father_Occ_1970 = 85 | 0.263 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 86 | -0.0706 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 93 | -0.233 |
| | (0.0251) |
| Child_Report_Father_Occ_1970 = 100 | 0.356 |
| | (0.0250) |
| Child_Report_Father_Occ_1970 = 111 | -0.246 |
| | (0.0266) |
| Child_Report_Father_Occ_1970 = 112 | -0.124 |
| | (0.0256) |
| Child_Report_Father_Occ_1970 = 123 | 0.245 |
| | (0.0255) |
| Child_Report_Father_Occ_1970 = 126 | -0.0672 |
| | (0.0244) |
| Child_Report_Father_Occ_1970 = 140 | -0.153 |
| | (0.0202) |
| Child_Report_Father_Occ_1970 = 142 | -0.293 |
| | (0.0178) |
| Child_Report_Father_Occ_1970 = 144 | 0.194 |
| | (0.0112) |
| Child_Report_Father_Occ_1970 = 145 | -0.122 |
| | (0.0244) |

| | |
|---|---|
| Child_Report_Father_Occ_1970 = 150 | -0.353 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 152 | -0.892 |
| | (0.0136) |
| Child_Report_Father_Occ_1970 = 153 | 0.132 |
| | (0.0188) |
| Child_Report_Father_Occ_1970 = 163 | 0.997 |
| | (0.0259) |
| Child_Report_Father_Occ_1970 = 174 | 0.206 |
| | (0.0252) |
| Child_Report_Father_Occ_1970 = 183 | 0.471 |
| | (0.0233) |
| Child_Report_Father_Occ_1970 = 184 | 0.330 |
| | (0.0265) |
| Child_Report_Father_Occ_1970 = 185 | -0.0855 |
| | (0.0289) |
| Child_Report_Father_Occ_1970 = 190 | 0.314 |
| | (0.0277) |
| Child_Report_Father_Occ_1970 = 191 | -0.240 |
| | (0.0239) |
| Child_Report_Father_Occ_1970 = 192 | -0.372 |
| | (0.0243) |
| Child_Report_Father_Occ_1970 = 195 | -0.126 |
| | (0.0233) |
| Child_Report_Father_Occ_1970 = 202 | 0.107 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 203 | 0.492 |
| | (0.0235) |
| Child_Report_Father_Occ_1970 = 211 | -0.783 |
| | (0.0229) |
| Child_Report_Father_Occ_1970 = 212 | -0.547 |
| | (0.0267) |
| Child_Report_Father_Occ_1970 = 215 | 0.762 |
| | (0.0242) |
| Child_Report_Father_Occ_1970 = 220 | -0.678 |
| | (0.0145) |
| Child_Report_Father_Occ_1970 = 222 | 0.0352 |
| | (0.0136) |
| Child_Report_Father_Occ_1970 = 225 | -0.226 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 226 | 0.379 |
| | (0.0253) |
| Child_Report_Father_Occ_1970 = 230 | -0.292 |
| | (0.0140) |
| Child_Report_Father_Occ_1970 = 233 | 0.224 |
| | (0.0135) |
| Child_Report_Father_Occ_1970 = 235 | 0.373 |
| | (0.0260) |
| Child_Report_Father_Occ_1970 = 240 | 0.00268 |
| | (0.0116) |
| Child_Report_Father_Occ_1970 = 245 | -0.00484 |
| | (0.00664) |
| Child_Report_Father_Occ_1970 = 265 | -0.271 |
| | (0.00973) |
| Child_Report_Father_Occ_1970 = 270 | -0.0823 |
| | (0.0158) |
| Child_Report_Father_Occ_1970 = 281 | -0.294 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 282 | 0.189 |
| | (0.00948) |

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|---|---|
| Child_Report_Father_Occ_1970 = 283 | 0.0337 |
| | (0.00954) |
| Child_Report_Father_Occ_1970 = 284 | -0.261 |
| | (0.0107) |
| Child_Report_Father_Occ_1970 = 285 | 0.0178 |
| | (0.0181) |
| Child_Report_Father_Occ_1970 = 301 | 0.410 |
| | (0.0246) |
| Child_Report_Father_Occ_1970 = 305 | -0.323 |
| | (0.0284) |
| Child_Report_Father_Occ_1970 = 310 | -0.0780 |
| | (0.0273) |
| Child_Report_Father_Occ_1970 = 312 | -0.216 |
| | (0.0241) |
| Child_Report_Father_Occ_1970 = 321 | 0.660 |
| | (0.0242) |
| Child_Report_Father_Occ_1970 = 326 | -0.187 |
| | (0.0242) |
| Child_Report_Father_Occ_1970 = 331 | -0.168 |
| | (0.0103) |
| Child_Report_Father_Occ_1970 = 332 | -0.242 |
| | (0.0241) |
| Child_Report_Father_Occ_1970 = 333 | 0.187 |
| | (0.0226) |
| Child_Report_Father_Occ_1970 = 343 | 0.0944 |
| | (0.0333) |
| Child_Report_Father_Occ_1970 = 361 | 0.131 |
| | (0.0200) |
| Child_Report_Father_Occ_1970 = 363 | -0.291 |
| | (0.0274) |
| Child_Report_Father_Occ_1970 = 374 | -0.0932 |
| | (0.0137) |
| Child_Report_Father_Occ_1970 = 381 | -0.224 |
| | (0.0246) |
| Child_Report_Father_Occ_1970 = 390 | -0.297 |
| | (0.0203) |
| Child_Report_Father_Occ_1970 = 410 | -1.159 |
| | (0.0131) |
| Child_Report_Father_Occ_1970 = 412 | -0.682 |
| | (0.0142) |
| Child_Report_Father_Occ_1970 = 413 | -0.838 |
| | (0.0293) |
| Child_Report_Father_Occ_1970 = 415 | 0.180 |
| | (0.00800) |
| Child_Report_Father_Occ_1970 = 420 | -0.308 |
| | (0.0260) |
| Child_Report_Father_Occ_1970 = 422 | 0.499 |
| | (0.0167) |
| Child_Report_Father_Occ_1970 = 424 | 0.373 |
| | (0.0138) |
| Child_Report_Father_Occ_1970 = 426 | 0.418 |
| | (0.0183) |
| Child_Report_Father_Occ_1970 = 430 | 0.0656 |
| | (0.0123) |
| Child_Report_Father_Occ_1970 = 433 | -0.00557 |
| | (0.0124) |
| Child_Report_Father_Occ_1970 = 436 | -0.455 |
| | (0.0133) |
| Child_Report_Father_Occ_1970 = 441 | -0.397 |
| | (0.00867) |

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|---|---|
| Child_Report_Father_Occ_1970 = 452 | 0.190 |
| | (0.0232) |
| Child_Report_Father_Occ_1970 = 454 | -0.385 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 455 | 0.00668 |
| | (0.0178) |
| Child_Report_Father_Occ_1970 = 461 | -0.126 |
| | (0.00918) |
| Child_Report_Father_Occ_1970 = 470 | -0.156 |
| | (0.0146) |
| Child_Report_Father_Occ_1970 = 471 | -0.0604 |
| | (0.0179) |
| Child_Report_Father_Occ_1970 = 472 | 0.171 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 473 | 0.0391 |
| | (0.00802) |
| Child_Report_Father_Occ_1970 = 475 | -0.0327 |
| | (0.0258) |
| Child_Report_Father_Occ_1970 = 480 | -1.995 |
| | (0.0206) |
| Child_Report_Father_Occ_1970 = 481 | -0.0141 |
| | (0.0158) |
| Child_Report_Father_Occ_1970 = 482 | -0.142 |
| | (0.0186) |
| Child_Report_Father_Occ_1970 = 483 | 0.179 |
| | (0.0294) |
| Child_Report_Father_Occ_1970 = 484 | -0.431 |
| | (0.0292) |
| Child_Report_Father_Occ_1970 = 485 | -0.921 |
| | (0.0335) |
| Child_Report_Father_Occ_1970 = 492 | -1.171 |
| | (0.0325) |
| Child_Report_Father_Occ_1970 = 495 | -0.839 |
| | (0.0257) |
| Child_Report_Father_Occ_1970 = 502 | 0.197 |
| | (0.0127) |
| Child_Report_Father_Occ_1970 = 510 | -0.190 |
| | (0.0183) |
| Child_Report_Father_Occ_1970 = 516 | -0.667 |
| | (0.0223) |
| Child_Report_Father_Occ_1970 = 522 | -0.0619 |
| | (0.0108) |
| Child_Report_Father_Occ_1970 = 530 | -0.681 |
| | (0.0135) |
| Child_Report_Father_Occ_1970 = 534 | -0.0303 |
| | (0.0182) |
| Child_Report_Father_Occ_1970 = 535 | 0.0275 |
| | (0.0258) |
| Child_Report_Father_Occ_1970 = 540 | -0.0505 |
| | (0.0247) |
| Child_Report_Father_Occ_1970 = 542 | 0.744 |
| | (0.0254) |
| Child_Report_Father_Occ_1970 = 545 | 0.231 |
| | (0.0189) |
| Child_Report_Father_Occ_1970 = 551 | 0.147 |
| | (0.0163) |
| Child_Report_Father_Occ_1970 = 554 | 0.491 |
| | (0.0197) |
| Child_Report_Father_Occ_1970 = 561 | 0.463 |
| | (0.0206) |

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|---|---|
| Child_Report_Father_Occ_1970 = 563 | 0.0819 |
| | (0.0154) |
| Child_Report_Father_Occ_1970 = 575 | 0.0301 |
| | (0.0274) |
| Child_Report_Father_Occ_1970 = 600 | -0.0155 |
| | (0.00733) |
| Child_Report_Father_Occ_1970 = 602 | -0.0539 |
| | (0.00942) |
| Child_Report_Father_Occ_1970 = 604 | -0.434 |
| | (0.0253) |
| Child_Report_Father_Occ_1970 = 610 | -0.372 |
| | (0.0188) |
| Child_Report_Father_Occ_1970 = 611 | 0.734 |
| | (0.0204) |
| Child_Report_Father_Occ_1970 = 614 | -0.858 |
| | (0.0301) |
| Child_Report_Father_Occ_1970 = 615 | -0.0248 |
| | (0.0225) |
| Child_Report_Father_Occ_1970 = 622 | -1.647 |
| | (0.0302) |
| Child_Report_Father_Occ_1970 = 623 | -0.368 |
| | (0.0245) |
| Child_Report_Father_Occ_1970 = 630 | -0.952 |
| | (0.0268) |
| Child_Report_Father_Occ_1970 = 631 | 0.146 |
| | (0.0153) |
| Child_Report_Father_Occ_1970 = 633 | 0.358 |
| | (0.0137) |
| Child_Report_Father_Occ_1970 = 640 | -0.208 |
| | (0.0110) |
| Child_Report_Father_Occ_1970 = 642 | 0.266 |
| | (0.0232) |
| Child_Report_Father_Occ_1970 = 643 | -0.371 |
| | (0.0243) |
| Child_Report_Father_Occ_1970 = 644 | 0.153 |
| | (0.0188) |
| Child_Report_Father_Occ_1970 = 645 | 0.237 |
| | (0.0254) |
| Child_Report_Father_Occ_1970 = 653 | -0.165 |
| | (0.0247) |
| Child_Report_Father_Occ_1970 = 662 | -0.258 |
| | (0.0195) |
| Child_Report_Father_Occ_1970 = 666 | -3.103 |
| | (0.0383) |
| Child_Report_Father_Occ_1970 = 673 | 0.0967 |
| | (0.0248) |
| Child_Report_Father_Occ_1970 = 674 | 0.800 |
| | (0.0245) |
| Child_Report_Father_Occ_1970 = 680 | -0.473 |
| | (0.00959) |
| Child_Report_Father_Occ_1970 = 690 | -0.218 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 692 | -0.225 |
| | (0.0114) |
| Child_Report_Father_Occ_1970 = 694 | -0.178 |
| | (0.0122) |
| Child_Report_Father_Occ_1970 = 695 | -0.196 |
| | (0.00778) |
| Child_Report_Father_Occ_1970 = 703 | -0.325 |
| | (0.0134) |

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|---|---|
| Child_Report_Father_Occ_1970 = 705 | -0.00282 |
| | (0.0104) |
| Child_Report_Father_Occ_1970 = 706 | 0.0905 |
| | (0.0157) |
| Child_Report_Father_Occ_1970 = 714 | 1.433 |
| | (0.0278) |
| Child_Report_Father_Occ_1970 = 715 | -0.131 |
| | (0.00722) |
| Child_Report_Father_Occ_1970 = 751 | -0.267 |
| | (0.00833) |
| Child_Report_Father_Occ_1970 = 752 | -0.151 |
| | (0.0246) |
| Child_Report_Father_Occ_1970 = 753 | -0.0975 |
| | (0.0114) |
| Child_Report_Father_Occ_1970 = 755 | -1.536 |
| | (0.0111) |
| Child_Report_Father_Occ_1970 = 760 | -1.788 |
| | (0.0266) |
| Child_Report_Father_Occ_1970 = 761 | -0.403 |
| | (0.0109) |
| Child_Report_Father_Occ_1970 = 762 | -0.214 |
| | (0.0268) |
| Child_Report_Father_Occ_1970 = 763 | -0.145 |
| | (0.0184) |
| Child_Report_Father_Occ_1970 = 770 | -0.247 |
| | (0.0257) |
| Child_Report_Father_Occ_1970 = 780 | -0.0967 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 785 | 0.244 |
| | (0.0114) |
| Child_Report_Father_Occ_1970 = 801 | -0.0852 |
| | (0.00702) |
| Child_Report_Father_Occ_1970 = 802 | -0.173 |
| | (0.0247) |
| Child_Report_Father_Occ_1970 = 821 | -0.229 |
| | (0.0250) |
| Child_Report_Father_Occ_1970 = 822 | -0.114 |
| | (0.00940) |
| Child_Report_Father_Occ_1970 = 902 | -0.257 |
| | (0.0240) |
| Child_Report_Father_Occ_1970 = 903 | -0.111 |
| | (0.00894) |
| Child_Report_Father_Occ_1970 = 910 | 0.247 |
| | (0.0260) |
| Child_Report_Father_Occ_1970 = 912 | 0.424 |
| | (0.0243) |
| Child_Report_Father_Occ_1970 = 925 | 0.00506 |
| | (0.0156) |
| Child_Report_Father_Occ_1970 = 961 | 0.0195 |
| | (0.0106) |
| Child_Report_Father_Occ_1970 = 962 | -0.665 |
| | (0.0105) |
| Child_Report_Father_Occ_1970 = 964 | 0.0746 |
| | (0.0101) |
| Child_Report_Father_Ind = 19 | 0.761 |
| | (0.0176) |
| Child_Report_Father_Ind = 27 | 1.051 |
| | (0.0209) |
| Child_Report_Father_Ind = 47 | 0.693 |
| | (0.0179) |

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|---|---|
| Child_Report_Father_Ind = 48 | 0.850 |
| | (0.0101) |
| Child_Report_Father_Ind = 49 | 1.181 |
| | (0.0189) |
| Child_Report_Father_Ind = 57 | 0.450 |
| | (0.0238) |
| Child_Report_Father_Ind = 67 | 0.678 |
| | (0.00521) |
| Child_Report_Father_Ind = 68 | 0.586 |
| | (0.00665) |
| Child_Report_Father_Ind = 69 | 0.516 |
| | (0.00544) |
| Child_Report_Father_Ind = 77 | 0.881 |
| | (0.00959) |
| Child_Report_Father_Ind = 107 | 0.751 |
| | (0.00779) |
| Child_Report_Father_Ind = 108 | 0.727 |
| | (0.00777) |
| Child_Report_Father_Ind = 118 | 0.573 |
| | (0.00991) |
| Child_Report_Father_Ind = 119 | 0.203 |
| | (0.0166) |
| Child_Report_Father_Ind = 127 | 0.731 |
| | (0.0151) |
| Child_Report_Father_Ind = 138 | 0.739 |
| | (0.0233) |
| Child_Report_Father_Ind = 139 | 2.177 |
| | (0.0179) |
| Child_Report_Father_Ind = 147 | 0.253 |
| | (0.0131) |
| Child_Report_Father_Ind = 148 | 1.099 |
| | (0.0239) |
| Child_Report_Father_Ind = 149 | 0.740 |
| | (0.0299) |
| Child_Report_Father_Ind = 157 | 0.586 |
| | (0.0273) |
| Child_Report_Father_Ind = 158 | 1.081 |
| | (0.0180) |
| Child_Report_Father_Ind = 168 | 0.263 |
| | (0.0207) |
| Child_Report_Father_Ind = 169 | 0.614 |
| | (0.0185) |
| Child_Report_Father_Ind = 177 | 1.135 |
| | (0.0128) |
| Child_Report_Father_Ind = 178 | 0.684 |
| | (0.0110) |
| Child_Report_Father_Ind = 179 | 0.418 |
| | (0.0145) |
| Child_Report_Father_Ind = 187 | 0.801 |
| | (0.0174) |
| Child_Report_Father_Ind = 188 | 1.178 |
| | (0.0133) |
| Child_Report_Father_Ind = 189 | 0.627 |
| | (0.0148) |
| Child_Report_Father_Ind = 197 | 0.621 |
| | (0.00841) |
| Child_Report_Father_Ind = 198 | 1.151 |
| | (0.0238) |
| Child_Report_Father_Ind = 199 | 0.539 |
| | (0.0109) |

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|---|---|
| Child_Report_Father_Ind = 207 | 0.746 |
| | (0.0233) |
| Child_Report_Father_Ind = 208 | 0.791 |
| | (0.0102) |
| Child_Report_Father_Ind = 209 | 0.921 |
| | (0.0118) |
| Child_Report_Father_Ind = 219 | 0.928 |
| | (0.00633) |
| Child_Report_Father_Ind = 227 | 0.993 |
| | (0.00815) |
| Child_Report_Father_Ind = 228 | 0.565 |
| | (0.0121) |
| Child_Report_Father_Ind = 237 | 0.219 |
| | (0.0256) |
| Child_Report_Father_Ind = 247, omitted | - |
| Child_Report_Father_Ind = 248 | 0.621 |
| | (0.0289) |
| Child_Report_Father_Ind = 258 | 1.023 |
| | (0.0244) |
| Child_Report_Father_Ind = 259 | 1.034 |
| | (0.0306) |
| Child_Report_Father_Ind = 268 | 0.654 |
| | (0.00740) |
| Child_Report_Father_Ind = 269 | 0.618 |
| | (0.0141) |
| Child_Report_Father_Ind = 287 | 0.592 |
| | (0.0116) |
| Child_Report_Father_Ind = 289 | 0.492 |
| | (0.00941) |
| Child_Report_Father_Ind = 317 | 0.354 |
| | (0.0106) |
| Child_Report_Father_Ind = 319 | 0.441 |
| | (0.0129) |
| Child_Report_Father_Ind = 327 | -0.0467 |
| | (0.0236) |
| Child_Report_Father_Ind = 328 | 1.161 |
| | (0.0104) |
| Child_Report_Father_Ind = 337 | -0.560 |
| | (0.0144) |
| Child_Report_Father_Ind = 338 | 1.289 |
| | (0.00995) |
| Child_Report_Father_Ind = 339 | 0.702 |
| | (0.0106) |
| Child_Report_Father_Ind = 347 | 0.0450 |
| | (0.0238) |
| Child_Report_Father_Ind = 357 | 0.889 |
| | (0.0160) |
| Child_Report_Father_Ind = 358 | 0.476 |
| | (0.0121) |
| Child_Report_Father_Ind = 359 | 1.050 |
| | (0.0296) |
| Child_Report_Father_Ind = 367 | 0.697 |
| | (0.0251) |
| Child_Report_Father_Ind = 369 | 1.185 |
| | (0.0149) |
| Child_Report_Father_Ind = 377 | 0.985 |
| | (0.0182) |
| Child_Report_Father_Ind = 379 | 0.787 |
| | (0.00987) |

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|---|---|
| Child_Report_Father_Ind = 387 | -0.869 |
| | (0.0173) |
| Child_Report_Father_Ind = 388 | -0.565 |
| | (0.0179) |
| Child_Report_Father_Ind = 389 | -0.251 |
| | (0.0140) |
| Child_Report_Father_Ind = 398 | 0.540 |
| | (0.00711) |
| Child_Report_Father_Ind = 407 | 0.826 |
| | (0.00803) |
| Child_Report_Father_Ind = 408 | 0.843 |
| | (0.0120) |
| Child_Report_Father_Ind = 409 | -0.560 |
| | (0.0360) |
| Child_Report_Father_Ind = 417 | 0.771 |
| | (0.00557) |
| Child_Report_Father_Ind = 419 | -0.0762 |
| | (0.0274) |
| Child_Report_Father_Ind = 427 | 0.943 |
| | (0.0183) |
| Child_Report_Father_Ind = 429 | 0.672 |
| | (0.0233) |
| Child_Report_Father_Ind = 447 | 0.685 |
| | (0.0230) |
| Child_Report_Father_Ind = 448 | 0.820 |
| | (0.00797) |
| Child_Report_Father_Ind = 449 | 0.317 |
| | (0.0200) |
| Child_Report_Father_Ind = 467 | 0.756 |
| | (0.00805) |
| Child_Report_Father_Ind = 468 | 1.022 |
| | (0.0234) |
| Child_Report_Father_Ind = 469 | 0.297 |
| | (0.0252) |
| Child_Report_Father_Ind = 477 | 0.331 |
| | (0.0141) |
| Child_Report_Father_Ind = 478 | 0.620 |
| | (0.0147) |
| Child_Report_Father_Ind = 479 | 1.134 |
| | (0.0237) |
| Child_Report_Father_Ind = 507 | 0.673 |
| | (0.0239) |
| Child_Report_Father_Ind = 508 | 0.783 |
| | (0.0195) |
| Child_Report_Father_Ind = 509 | 1.150 |
| | (0.0238) |
| Child_Report_Father_Ind = 527 | 0.864 |
| | (0.0145) |
| Child_Report_Father_Ind = 528 | 0.771 |
| | (0.0227) |
| Child_Report_Father_Ind = 529 | -1.769 |
| | (0.0253) |
| Child_Report_Father_Ind = 539 | 1.195 |
| | (0.0197) |
| Child_Report_Father_Ind = 558 | 1.057 |
| | (0.0159) |
| Child_Report_Father_Ind = 559 | 0.138 |
| | (0.0140) |
| Child_Report_Father_Ind = 567 | 0.420 |
| | (0.0182) |

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|---|---|
| Child_Report_Father_Ind = 569 | 0.980 |
| | (0.0103) |
| Child_Report_Father_Ind = 587 | 0.857 |
| | (0.0105) |
| Child_Report_Father_Ind = 588 | 1.273 |
| | (0.0258) |
| Child_Report_Father_Ind = 607 | 0.691 |
| | (0.0147) |
| Child_Report_Father_Ind = 608 | 0.149 |
| | (0.0104) |
| Child_Report_Father_Ind = 609 | 1.166 |
| | (0.0142) |
| Child_Report_Father_Ind = 617 | 1.267 |
| | (0.0184) |
| Child_Report_Father_Ind = 618 | -0.623 |
| | (0.0241) |
| Child_Report_Father_Ind = 627 | 0.170 |
| | (0.0244) |
| Child_Report_Father_Ind = 628 | 0.409 |
| | (0.00703) |
| Child_Report_Father_Ind = 637 | -0.364 |
| | (0.0273) |
| Child_Report_Father_Ind = 638 | 0.349 |
| | (0.0162) |
| Child_Report_Father_Ind = 639 | 0.456 |
| | (0.00980) |
| Child_Report_Father_Ind = 647 | 0.686 |
| | (0.0187) |
| Child_Report_Father_Ind = 648 | 0.414 |
| | (0.0169) |
| Child_Report_Father_Ind = 649 | 0.798 |
| | (0.0170) |
| Child_Report_Father_Ind = 657 | 0.521 |
| | (0.0158) |
| Child_Report_Father_Ind = 658 | 0.240 |
| | (0.0254) |
| Child_Report_Father_Ind = 667 | 0.413 |
| | (0.0174) |
| Child_Report_Father_Ind = 668 | -1.769 |
| | (0.0242) |
| Child_Report_Father_Ind = 669 | 0.905 |
| | (0.0117) |
| Child_Report_Father_Ind = 677 | 0.752 |
| | (0.0103) |
| Child_Report_Father_Ind = 679 | 1.171 |
| | (0.0263) |
| Child_Report_Father_Ind = 688 | 0.291 |
| | (0.0247) |
| Child_Report_Father_Ind = 689 | 0.994 |
| | (0.0240) |
| Child_Report_Father_Ind = 697 | 0.646 |
| | (0.0110) |
| Child_Report_Father_Ind = 698 | 1.794 |
| | (0.0194) |
| Child_Report_Father_Ind = 707 | 0.728 |
| | (0.0128) |
| Child_Report_Father_Ind = 708 | 0.509 |
| | (0.0186) |
| Child_Report_Father_Ind = 709 | 0.636 |
| | (0.0200) |

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|---|---|
| Child_Report_Father_Ind = 717 | 1.095 |
| | (0.00829) |
| Child_Report_Father_Ind = 718 | 0.0692 |
| | (0.00925) |
| Child_Report_Father_Ind = 727 | 0.452 |
| | (0.0139) |
| Child_Report_Father_Ind = 738 | -0.331 |
| | (0.0252) |
| Child_Report_Father_Ind = 739 | 0.652 |
| | (0.0130) |
| Child_Report_Father_Ind = 748, omitted | - |
| Child_Report_Father_Ind = 749 | 1.298 |
| | (0.0249) |
| Child_Report_Father_Ind = 757 | 0.357 |
| | (0.00551) |
| Child_Report_Father_Ind = 758 | 0.644 |
| | (0.0289) |
| Child_Report_Father_Ind = 759 | 0.671 |
| | (0.0160) |
| Child_Report_Father_Ind = 777 | 0.356 |
| | (0.0235) |
| Child_Report_Father_Ind = 779 | 0.101 |
| | (0.0109) |
| Child_Report_Father_Ind = 788, omitted | - |
| Child_Report_Father_Ind = 798, omitted | - |
| Child_Report_Father_Ind = 807 | 1.005 |
| | (0.0173) |
| Child_Report_Father_Ind = 809 | 0.0529 |
| | (0.0171) |
| Child_Report_Father_Ind = 828 | 0.146 |
| | (0.0143) |
| Child_Report_Father_Ind = 829 | 0.297 |
| | (0.0155) |
| Child_Report_Father_Ind = 838 | 0.550 |
| | (0.00970) |
| Child_Report_Father_Ind = 839 | 0.212 |
| | (0.0234) |
| Child_Report_Father_Ind = 848 | 0.337 |
| | (0.0107) |
| Child_Report_Father_Ind = 849 | 0.0653 |
| | (0.0160) |
| Child_Report_Father_Ind = 857 | 0.299 |
| | (0.00586) |
| Child_Report_Father_Ind = 858 | 0.541 |
| | (0.00777) |
| Child_Report_Father_Ind = 867 | 0.432 |
| | (0.0259) |
| Child_Report_Father_Ind = 877 | 0.720 |
| | (0.00856) |
| Child_Report_Father_Ind = 878 | 0.197 |
| | (0.0252) |
| Child_Report_Father_Ind = 887 | 0.0143 |
| | (0.0236) |
| Child_Report_Father_Ind = 888 | 0.949 |
| | (0.00862) |
| Child_Report_Father_Ind = 889 | 0.914 |
| | (0.0124) |

| | |
|---|---|
| Child_Report_Father_Ind = 897 | 0.724 |
| | (0.0184) |
| Child_Report_Father_Ind = 907 | 0.720 |
| | (0.00719) |
| Child_Report_Father_Ind = 917 | 0.686 |
| | (0.00521) |
| Child_Report_Father_Ind = 927 | 0.500 |
| | (0.0104) |
| Child_Report_Father_Ind = 937 | 0.693 |
| | (0.00628) |
| Father_Age20_Dummies = 1 | -0.590 |
| | (0.00430) |
| Father_Age20_Dummies = 2 | -0.250 |
| | (0.00377) |
| Father_Age20_Dummies = 3 | -0.116 |
| | (0.00366) |
| Father_Age20_Dummies = 4 | -0.0603 |
| | (0.00387) |
| Father_Age20_Dummies = 6 | 0.0841 |
| | (0.00389) |
| Father_Age20_Dummies = 7 | -0.00307 |
| | (0.00393) |
| Father_Age20_Dummies = 8 | 0.211 |
| | (0.00465) |
| Father_Age20_Dummies = 9 | -0.458 |
| | (0.00596) |
| Constant | 10.19 |
| | (0.0140) |
| Observations | 498,987 |
| R-squared | 0.550 |

**Appendix C. Transition matrices of fathers' earnings quartile against sons earnings quartile (row percentages)**

**(a) Time-average fathers' earnings**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 42 | 25 | 21 | 12 | **256** |
| | **Second** | 26 | 32 | 28 | 14 | **257** |
| | **Third** | 22 | 27 | 25 | 25 | **255** |
| | **Top** | 14 | 14 | 24 | 48 | **256** |

**(b) TSTSLS Model M1**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 40 | 30 | 21 | 10 | **262** |
| | **Second** | 25 | 26 | 26 | 23 | **267** |
| | **Third** | 20 | 27 | 25 | 28 | **313** |
| | **Top** | 17 | 12 | 27 | 43 | **182** |

**(c) TSTSLS Model M2**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 41 | 29 | 20 | 10 | **261** |
| | **Second** | 30 | 27 | 24 | 19 | **256** |
| | **Third** | 16 | 27 | 29 | 27 | **251** |
| | **Top** | 16 | 15 | 25 | 44 | **256** |

**(d) TSTSLS Model M3**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 39 | 28 | 22 | 10 | **258** |
| | **Second** | 30 | 27 | 23 | 20 | **255** |
| | **Third** | 18 | 28 | 28 | 26 | **258** |
| | **Top** | 16 | 16 | 25 | 43 | **253** |

**(e) TSTSLS Model M4**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 40 | 29 | 19 | 11 | **256** |
| | **Second** | 32 | 28 | 24 | 16 | **257** |
| | **Third** | 16 | 22 | 32 | 30 | **255** |
| | **Top** | 15 | 19 | 23 | 42 | **256** |

**(f) TSTSLS Model M5**

| | | Sons earnings quartile | | | | |
|---|---|---|---|---|---|---|
| | | **Bottom** | **Second** | **Third** | **Top** | **n** |
| **Fathers earnings quartile** | **Bottom** | 42 | 30 | 18 | 10 | **256** |
| | **Second** | 30 | 25 | 27 | 18 | **256** |
| | **Third** | 18 | 26 | 29 | 28 | **257** |
| | **Top** | 14 | 18 | 24 | 44 | **255** |

**Notes**: Authors' calculations using the PSID dataset. Figures refer to row percentages.

**Appendix D. Cross-tabulation between parent and offspring reports of fathers' education, occupation and industry (row percentages)**

**(a) Father's education**

| | | Offspring report of fathers' education | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Grades 1-5** | **Grades 6-8** | **Grades 9-11** | **Grade 12** | **Some college** | **College degree** | **Advanced degree** | **n** |
| **Fathers' own report of fathers' education** | **Grades 1-5** | 50 | 30 | 10 | 10 | 0 | 0 | 0 | **10** |
| | **Grades 6-8** | 15 | 59 | 13 | 11 | 2 | 0 | 0 | **46** |
| | **Grades 9-11** | 1 | 25 | 39 | 30 | 3 | 0 | 2 | **114** |
| | **Grade 12** | 0 | 4 | 10 | 75 | 11 | 0 | 0 | **327** |
| | **Some college** | 1 | 1 | 2 | 33 | 51 | 11 | 1 | **202** |
| | **College degree** | 0 | 0 | 0 | 6 | 13 | 73 | 8 | **128** |
| | **Advanced degree** | 0 | 0 | 0 | 2 | 8 | 30 | 60 | **179** |

**Notes**: Authors' calculations using the PSID dataset. Figures refer to row percentages

**(b) Fathers' occupation (1 digit groups)**

| | | Offspring report of fathers' occupation | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Professional** | **Manager** | **Sales** | **Clerical** | **Crafts** | **Operative** | **Transport** | **Laborers** | **Farmers** | **Service** | **n** |
| **Fathers' own report of fathers' occupation** | **Professional** | 25 | 19 | 7 | 3 | 20 | 9 | 6 | 3 | 3 | 4 | **181** |
| | **Manager** | 16 | 27 | 11 | 4 | 22 | 8 | 4 | 2 | 4 | 2 | **193** |
| | **Sales** | 16 | 10 | 24 | 4 | 24 | 10 | 2 | 0 | 6 | 2 | **49** |
| | **Clerical** | 6 | 12 | 12 | 15 | 24 | 18 | 6 | 6 | 0 | 3 | **34** |
| | **Crafts** | 8 | 10 | 4 | 2 | 37 | 8 | 8 | 8 | 10 | 5 | **191** |
| | **Operative** | 5 | 13 | 3 | 0 | 25 | 29 | 6 | 11 | 5 | 3 | **87** |
| | **Transport** | 8 | 8 | 0 | 4 | 16 | 16 | 23 | 15 | 9 | 1 | **75** |
| | **Laborers** | 11 | 5 | 3 | 0 | 16 | 11 | 19 | 14 | 8 | 14 | **37** |
| | **Farmers** | 7 | 5 | 12 | 0 | 17 | 7 | 10 | 7 | 34 | 0 | **41** |
| | **Service** | 7 | 10 | 0 | 2 | 20 | 14 | 3 | 10 | 12 | 22 | **59** |

**Notes**: Authors' calculations using the PSID dataset. Figures refer to row percentages

**(c) Fathers' industry (1 digit groups)**

| | | Offspring report of fathers' industry | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Agriculture** | **Mining** | **Construction** | **Manufacturing** | **Transport** | **Wholesale / retail** | **Finance** | **Business** | **Personal** | **Entertainment** | **Services** | **Public admin** | **n** |
| **Fathers' own report of fathers' industry** | **Agriculture** | 81 | 0 | 4 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 2 | 2 | **48** |
| | **Mining** | 8 | 54 | 8 | 8 | 0 | 8 | 0 | 8 | 0 | 0 | 0 | 8 | **13** |
| | **Construction** | 3 | 0 | 59 | 10 | 8 | 8 | 0 | 2 | 0 | 0 | 6 | 2 | **86** |
| | **Manufacturing** | 5 | 1 | 4 | 68 | 3 | 6 | 1 | 2 | 1 | 0 | 4 | 4 | **288** |
| | **Transport** | 2 | 1 | 6 | 11 | 66 | 6 | 1 | 2 | 0 | 0 | 1 | 3 | **93** |
| | **Wholesale / retail** | 5 | 1 | 6 | 15 | 4 | 50 | 4 | 5 | 0 | 3 | 3 | 5 | **131** |
| | **Finance** | 0 | 0 | 10 | 18 | 0 | 8 | 56 | 3 | 0 | 0 | 0 | 5 | **39** |
| | **Business** | 3 | 0 | 9 | 15 | 9 | 6 | 0 | 45 | 0 | 0 | 3 | 9 | **33** |
| | **Personal** | 8 | 0 | 8 | 15 | 0 | 8 | 0 | 0 | 54 | 0 | 0 | 8 | **13** |
| | **Entertainment** | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 50 | 0 | 25 | **4** |
| | **Services** | 4 | 1 | 8 | 10 | 2 | 5 | 5 | 3 | 0 | 0 | 57 | 7 | **146** |
| | **Public admin** | 6 | 0 | 5 | 14 | 6 | 4 | 0 | 2 | 0 | 0 | 2 | 60 | **81** |

**Notes**: Authors' calculations using the PSID dataset. Figures refer to row percentages.