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ABSTRACT

Labor and Financial Market Interactions: The Case of Labor Income Risk and Car Insurance in the UK 1969-95*

Microeconomic theory predicts that under certain regularity conditions higher idiosyncratic risk increases the propensity to insure against independent marketable risks. We apply these predictions to the specific case of labor income risk and car insurance using data from the UK. The main empirical results are:

- higher labor income risk induces a higher demand for car insurance.
- the effects of increases in labor income risk after 1979 seem to be more than offset by a more liberal financial market.
- the effects seem to be important on the macro level in the 70s whereas they become negligible in the 80s and 90s.

JEL Classification: D12, D81, G22, J31

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1 Introduction

This paper focuses on a specific example of labor and financial market interactions. If households cannot fully insure against labor income risk, bigger exposure in the labor market will decrease their willingness to bear risk in the financial market.[2] This implies a higher insurance demand or a smaller share of risky assets in their portfolio.[3]

We use the Family Expenditure Survey (FES) and National Travel Survey (NTS) for the UK. Merging these data sets gives us information on labor market characteristics and insurance expenditure. Moreover, it allows us to control for households' exposure in the insurable risk. Finally, the sample period 1969-96 allows us to investigate the effects of changes in the labor and financial market in the UK after 1979.

We focus on the effect of income risk on car insurance because the available data allows us to control for the exposure in the insurable risk, i.e., the value of the car. Moreover, cars are one of the biggest durable assets in households' balance sheets together with housing. Thus, the decision how much insurance to buy for the car is an important one. Finally, we have enough variation in the data because households nearly always buy more than the mandatory amount of insurance.

We use occupational proxies for income risk to assess the relationship between labor income risk and car insurance demand in the UK in the period 1969-95. In particular, the empirical hypothesis of this paper is that unskilled-manual workers demand more car

[2] This is only true if one imposes certain regularity conditions on the utility function which are, however, fairly general because they are satisfied for the class of HARA utility functions. Decreasing absolute risk aversion and decreasing absolute prudence as defined by Kimball (1990) are an example for a sufficient regularity condition in the case of independent marketable and uninsurable risks (see section 2).

[3] There are other potential interactions which we neglect. E.g., if labor income becomes more risky, it will become less useful as collateral so that some households might become more liquidity constrained. Anecdotal evidence suggests that these interactions become ever more important. Information of creditors on households' financial decisions and positions become more detailed because of public or private credit bureaus which merge financial information on households from various sources.

insurance per car value than skilled non-manual workers because their labor income risk is higher. We indeed …nd support for the hypothesis that unskilled manual workers demand more car insurance and the skilled non-manual workers demand less. Easier access to credit in the 80s and 90s seems to have mitigated this e¤ect although unskilled manual workers were exposed to higher relative income risk.

Although the empirical application might seem quite speci…c it provides insights of a more general nature. Once we consider interactions between labor and …nancial markets as important, policies meant to render the labor market more ‡exible should no longer ignore the potential of …nancial markets to bu¤er some of the welfare decreasing e¤ects which arise in a world of imperfect markets and risk averse agents. The conclusions we draw from the UK experience are particularly relevant for countries in continental Europe which on the one hand attempt to make labor markets more ‡exible, but on the other hand very often still have quite thin …nancial markets. In the light of our results the recent deregulation in …nancial markets, however, seems to make labor market reforms less costly today than 20 years ago.

To further motivate our analysis we now want to provide some suggestive aggregate evidence which indicates that interactions between the labor and …nancial market indeed might be relevant in the aggregate.

1.1 Suggestive Aggregate Evidence

The suggestive cross-country evidence is summarized in Figure 1. We use OECD-data (1991, 1998) on direct-gross premiums paid in the non-life insurance sector per capita or per GDP for the period 1983-89 and 1990-96.[4] We calculate averages of the insurance premiums paid in the 80s and rank them on a scale from 1 to 15 where 1 stands for the country with the highest average insurance expenditure and 15 for the country with the lowest one. We then

[4] Australia, New Zealand, Canada, and Japan are omitted because of incomparable data on non-life insurance.

use the job security indicators for the 80s provided by the OECD (1999) where 1 indicates low job security and plot it against the ranked means of insurance expenditure. We also construct an indicator for the exposure of households to employment risk.[5] As is apparent in Figure 1 this results in a positive relationship between job insecurity, or employment risk, and non-life insurance expenditure per capita or GDP in the 80s.[6] This suggests that financial and labor market interactions matter in the aggregate. As a further indication we report that the Spearman-correlation coefficient for the relationship between non-life insurance per capita or non-life insurance per GDP and job security or the employment risk indicator is always bigger than 0.63. The hypothesis that the variables are independent can be rejected at least on a 5% significance level in the four cases.

Of course, we neglect supply-side factors. It might very well be that the low insurance demand in some countries is a result of less developed insurance sectors. E.g., higher mark-ups might induce a lower demand in monetary terms if demand is sufficiently elastic. But it then remains to be explained why the insurance industry tends to be more developed in countries with more flexible labor markets. Among other factors the structure of the supply side is quite possibly linked to the amount of risk borne by the population which varies across countries, e.g., because of different labor market institutions.[7] This does not seem

[5] We calculate a weighted average of the job security rank and the rank of net replacement ratios of unemployment insurance using OECD(1994) data for 1981 and 1991, respectively, where a high rank means a higher replacement ratio. We weight the unemployment insurance rank with the inverse of the job security rank where we presuppose that unemployment insurance matters the more the less job security is provided. Hence, for a country in which job security measures are non-existent unemployment insurance reduces the exposure of households a lot whereas for countries with strong job security legislation additional unemployment insurance matters less. Ideally, our indicator should take into account differences in labor turnover as well, e.g., unemployment persistence. Then unemployment insurance might very well become complements.

[6] If we do the same exercise for the 90s or the whole period 1983-96 the relationship remains robust. For the whole sample we used the unweighted average of the indexes for the 80s and 90s and the rank of the average of the replacement ratios of '81 and '91.

[7] An alternative explanation for the lower development of insurance markets in Southern European coun-

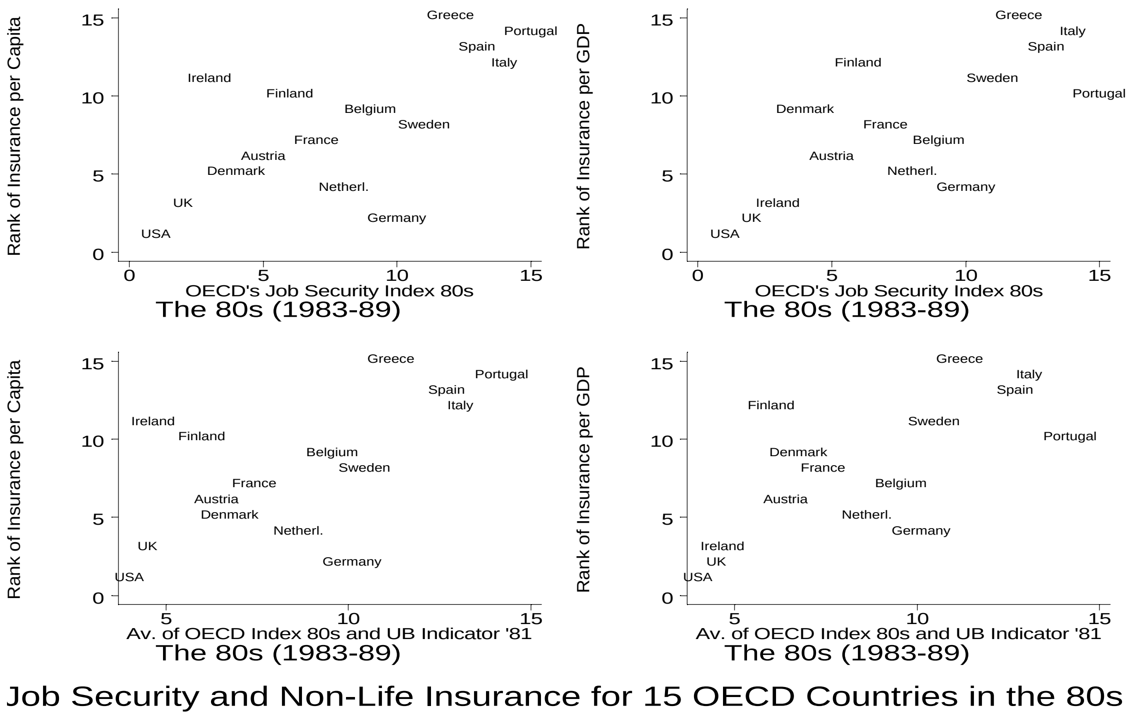

Figure 1: Job Security and Non-Life Insurance in the 80s

to be the case for the UK which had a relatively well developed insurance market already before the labor market reforms. One explanation might be that the labor market in the UK was already relatively flexible compared to the ones in continental Europe before 1979.

Having emphasized the potential aggregate importance and the political relevance of labor and financial market interactions it is interesting to investigate whether we can detect the mechanisms at work on a micro level and assess their aggregate importance. We now want to briefly summarize the existing literature before we turn to the theoretical foundations.

tries as Spain, Italy, Portugal and Greece are family networks which might provide a substitute (see Bentolila and Ichino (2000)). However, this substitute is clearly imperfect since the potential for risk diversification is smaller. Moreover, the direction of causation is unclear.

1.2 Existing Literature

The existing papers on the effect of labor income risk on portfolio choice or insurance demand differ with respect to the construction of the indicator for labor income risk, data sources and countries. Gakidis (1998) and Vissing-Jorgensen (1999) use the PSID, assume an income process and use the variance of income realizations as proxy for income risk. Souleles (1999) uses the Consumer Expenditure Survey and looks at the effect of standard deviations of consumption growth on portfolio choice.[8] Guiso, Jappelli and Terlizzese (1996) and Guiso and Jappelli (1996) use the Bank of Italy Survey of Household Income and Wealth and Souleles (1999) uses the Michigan Consumer Sentiment Survey to exploit direct information on perceived income risk. Haliassos and Bertaut (1995) use educational and occupational proxies for income risk contained in the Survey of Consumer Finances for the US.

All these papers find some support for the hypothesis that higher labor income risk decreases the demand for risky assets or increases the demand for insurance.[9] The papers closest to our research are the one of Guiso and Jappelli (1996) because it is the only one investigating the effect of labor income risk on insurance demand; and the one of Haliassos and Bertaut (1995) because it uses occupational proxies for labor income risk. However, it only analyzes interactions between labor income risk and portfolio choice.

This paper contributes to the literature in the following way:

1. In our sample period (1969-95) labor and financial markets changed in the UK when Ms. Thatcher took power in 1979. This allows us to address another dimension of labor and financial market interaction; in particular, whether easier credit access mitigated the effects of higher labor income risk.

2. By considering the specific case of motor-vehicle insurance, we are able to construct a proxy for the insurable exposure of households: the value of the car. The only paper which

[8] He uses flows instead of stocks, however, because of the data source.

[9] Gakidis (1998) only finds that the probability of zero-income events has a statistically significant negative effect on the demand for risky assets.

analyzes interactions of insurance and labor income risk, Guiso and Jappelli (1996), does not control for the insurable exposure of households.

3. Repeated cross-sectional data allows us to address estimation problems occurring with pure cross-sectional data as in some of the papers mentioned above, e.g., Guiso and Jappelli (1996) and Haliassos and Bertaut (1995).

4. We study a di¤erent country and data set.

After pointing out how our paper relates to the literature we now present the structure of the rest of the paper. In Section 2 we present the theoretical background needed for our speci…c empirical application. We discuss the identifying assumptions in Section 3. We describe the structure of the British insurance market in Section 4 and the data in Section 5. In Section 6 the results are presented and discussed before we conclude and point out policy implications in Section 7.

2 Theoretical Background: Car insurance demand and labor income risk

Insurance markets are a special case of markets for contingent claims. Arrow (1964) and Debreu (1959, ch. 7) developed contingent claim analysis to establish the well known result that in perfect and complete markets consumption of optimally insured individuals should only depend on aggregate risk/wealth. These kind of insurance contracts are not observed in reality for reasons of moral hazard and/or adverse selection.[10] Hence households cannot fully eliminate their idiosyncratic component of labor income risk. Moreover, the ‡uctuations of labor income in‡uence the amount of risk households are willing to bear in other markets.

[10] Chiu and Karni (1998) analyze the provision of unemployment insurance in a setting where adverse selection and moral hazard interact and can explain why private unemployment insurance does not exist. Another stream of literature suggests that households' exposure to idiosyncratic risk is an optimal, i.e., endogenous response in a setting without commitment where consumers are su¢ciently impatient, contract partners have symmetric information, and it is impossible for third parties to enforce the contract (Hayashi (1996), Kocherlakota (1996) and their references).

An increase of labor income risk does not generally increase the demand for insurance. However, this is unambiguously the case once regularity conditions are imposed on the utility function, such as proper risk aversion (Pratt and Zeckhaeuser (1987)), standard risk aversion (Kimball (1993)), or risk vulnerability (Gollier and Pratt (1996)). Assuming decreasing absolute risk aversion (DARA) and decreasing absolute prudence (DAP)[11] is sufficient and implies standard risk aversion, the strongest of the three concepts mentioned above.[12] Interestingly, all HARA utility functions conform to these concepts which are discussed in more detail in Gollier and Pratt (1996) and Gollier (1999).

Let us now set up the basic framework before we discuss our identifying assumptions. We are interested in the effects of household i's labor income risk, $\sigma^2_{y_{it}}$, on its coinsurance rate, α_{it}.[13] This relationship will be affected by two state variables: financial wealth, a_{it}, and the value of the car, v_{it}. For simplicity assume that every period a random proportion δ of the value of the car can be lost.[14] Clearly, insurance demand will also depend on the distribution of the proportion of losses, i.e., on their first and second moments, $E_t[\delta_{it+1}]$ and $\sigma^2_{\delta_{it}}$. Finally, it is well known that with risk-averse households and risk neutral insurers we need a positive mark-up μ_{it} so that households do not fully insure.

In general one can write the relationship between the coinsurance rate and labor income risk in the following way:

$$0 = f\left(\alpha_{it}; a_{it}; \sigma^2_{y_{it}}; v_{it}; E_t[\delta_{it+1}]; \sigma^2_{\delta_{it}}; \mu_{it}\right), \tag{1}$$

[11] DARA is defined as $\frac{\partial\left(\frac{u''(x)}{u'(x)}\right)}{\partial x} \leq 0$. Kimball (1990) defined the concept of absolute prudence as follows: $p(x) = -\frac{u'''(x)}{u''(x)}$ where u(.) is the utility function. DAP is then defined as $p'(x) \leq 0$. Note that $p(x) > 0$ as long as precautionary savings matter because then $u'''(x) > 0$.

[12] In the following we always use DARA and DAP as sufficient conditions and thus the concept of standard risk aversion. We also could use one of the other concepts, but the conditions are more technical and thus less intuitive.

[13] The coinsurance rate is the proportion of the expected loss that is insured.

[14] We abstract from depreciation for parsimony.

where the index i denotes household i.[15] We show in our companion paper that DARA and DAP indeed implies that $\frac{\partial \alpha_{it}}{\partial \sigma^2_{y_{it}}} \geq 0$. I.e., households will insure more, if they are exposed to higher labor income risk ceteris paribus. This is the comparative static result we will try to detect in the data.

Let us point out that in general the effect of labor income risk on insurance demand depends on the households' utility maximizing joint decision concerning wealth accumulation, insurance demand and portfolio choice (see, e.g., Mayers and Smith (1983)). We are not able to analyze this joint decision with the available data. However, we are able to answer the more moderate question whether households with a higher labor income risk demand more insurance conditional on wealth and the value of the car. We have to assume that interactions between portfolio choice and insurance demand do not drive our results. Controlling for these interactions in the empirical part is impossible because it would require extremely detailed data on assets and the distributions of their returns. This is because there might be hedging possibilities in financial markets. In general, portfolio choice depends on the exposure to insurable risk and insurance demand depends on the riskiness of the portfolio.[16]

Unfortunately, even in the very simplified and stylized framework we just described there is no closed-form solution that allows to write insurance demand as a function of labor income risk. Moreover, we are not aware of any data set that would allow a structural estimation under reasonable assumptions.[17] Hence, we will try to find the correlation in the

[15] For a more explicit presentation of a model along the lines just mentioned we refer to the companion paper (Koeniger (2000)).

[16] There are two other potential interactions which we neglect. Firstly, the risk associated with the vehicle stock might be correlated with labor income risk. Secondly, the exposure of cars might be correlated with other insurable risks. As soon as risks are negatively correlated the comparative statics result mentioned above might fail to hold. Although theoretically possible these interactions do not seem to be important for our application.

[17] In our case we would need data on the loss distribution of the insurable risk and labor income to estimate their joint distribution in order to calculate the necessary moments.

data between insurance demand and labor income risk in an alternative way.

Before we turn to the identifying assumptions to retrieve the correlation we are interested in from the data let us anticipate our main empirical results:

- higher labor income risk induces a higher demand for car insurance.
- the effects of increases in labor income risk in the UK after 1979 seem to be more than offset by a more liberal financial market.
- the effects seem to be important on the macro level in the 70s whereas they become negligible in the 80s and 90s.

3 Identifying assumptions

We now discuss what identifying assumptions we have to make to retrieve the correlation we are interested in with our data set.

A) Identifying labor income risk

First we want to mention how we construct proxies for $\sigma^2_{y_{it}}$. Because of repeated cross-sectional data we cannot track households' incomes over time. Thus, we cannot avoid an assumption to disentangle idiosyncratic risk and variation resulting from heterogeneity. Moreover, the FES does not contain any direct measure of income risk for households. Hence, we identify subpopulations[18] which differ with respect to their labor income risk and investigate which subpopulations demand more car insurance on average.

The choice of the subpopulations is crucial. The more homogenous the subpopulations the better we can identify idiosyncratic risk. We will control for observable heterogeneity. If

[18] This approach is different from the one of Banks et al. (1997) who assume a specific income process and thus are able to decompose risk into aggregate, cohort, and idiosyncratic components. Because of the repeated cross-sectional data, however, they need stronger assumptions to identify the process than with panel data. In particular, as in our analysis it is only possible under certain assumptions to disentangle idiosyncratic risk and variance resulting from cross-sectional heterogeneity.

heterogeneity is unobservable, we will have to make identifying assumptions to disentangle di¤erences in idiosyncratic risk from di¤erences in unobservable subpopulation characteristics.

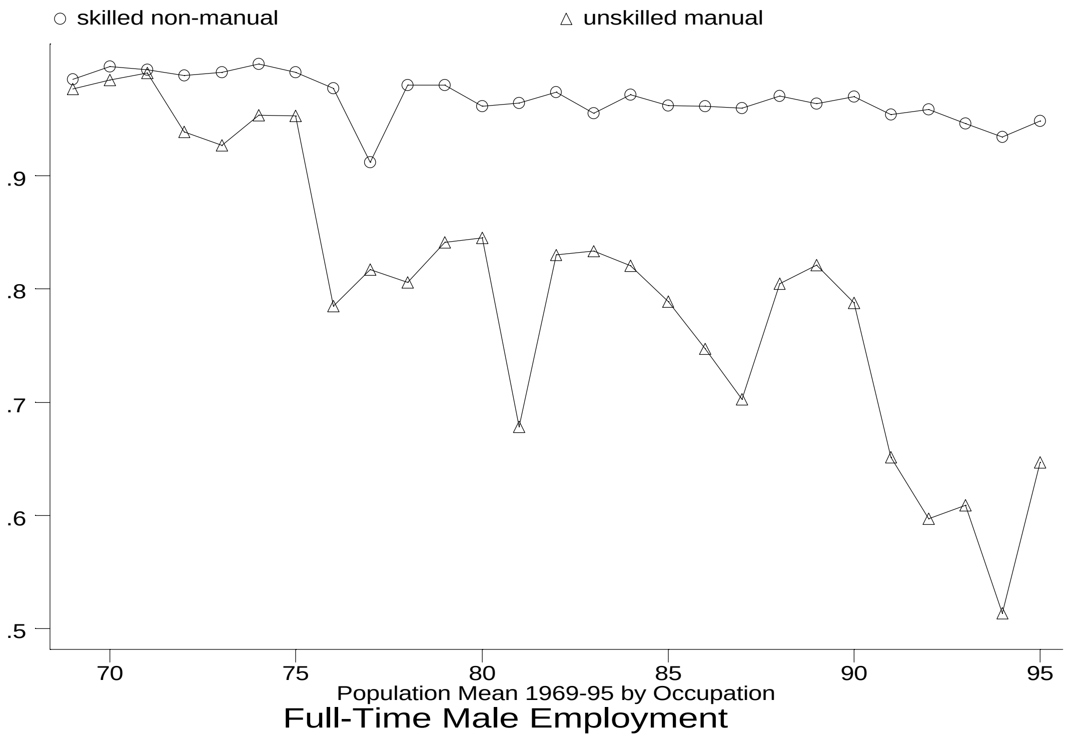

Figure 2: Full-Time Employment of Skilled and Unskilled 1969-95

Let us brie‡y mention why idiosyncratic risk is not eliminated for subpopulations. Were it only for moral hazard, idiosyncratic risk should not exist for any subpopulation because it is possible to observe subpopulation averages. These will be taken as given by individuals, if the subpopulation's size is big enough. Thus, it is in principle possible to write insurance contracts which are based on the observable averages such that all idiosyncratic risk is eliminated. It is not possible to fully insure the subpopulation's income stream if we do have limited commitment, i.e., insurance contracts can be broken at any point in time (see, e.g., Hayashi (1996)). It turns out that empirically idiosyncratic risk plays a role for subpopulations so that choosing subpopulation membership as proxy for labor income risk is a feasible strategy.[19]

Hypothesis: Unskilled manual workers are exposed to more labor income risk whereas skilled non-manual are less exposed to it.

We choose the subpopulations of unskilled manual (unskman) and skilled non-manual (sknman) workers. These subpopulations are chosen because unobservables, like ability, which are potentially in‡uencing income risk are supposedly similar in respective occupational[20] categories.[21]

Our sample consists of households in the working-age (see Section 5 for more details). Since we exclude self-employed from our sample because of problems of underreporting, labor income risk is mainly employment risk. Thus, we want to provide some empirical support for our hypothesis by looking at male full-time employment for the respective subpopulations.[22]

[19] Cochrane (1991) and Attanasio and Davis (1996) provide evidence of income variations for subpopulations for the US, Banks, Blundell, and Brugiavini (1997) for the UK, Jappelli and Pistaferri (1999) for Italy, and Townsend (1994) and Udry (1994) for developing countries.

[20] We do not report results for subpopulations which di¤er with respect to education. This is because the data does contain information on education only since 1978 so that a comparison of labor market regimes is impossible for these subpopulations. However, the categories of unskilled manual and skilled non-manual workers are highly correlated with low and high education, respectively. Moreover, we are not able to control for education in the imputation of the value of the car.

[21] This choice is supported by Schmitt (1995), Table 5.5, for the UK in the 80s. Moreover, occupational variables are often used as instruments which shall be correlated with consumption variability (e.g. Dynan (1993)). Using surveys with data on subjective income expectations in the 90s for Italy and the US, respectively, the results of Guiso and Jappelli (1998), Manski and Straub (1999), and Farber (1996) support that the more educated and skilled feel themselves less exposed to employment risk and face a smaller economic loss once they become unemployed. Unskilled workers are a clearly overrepresented in the pool of long-term unemployed in the UK (OECD (1993)).

[22] It is well known that females tend to work more part-time than males. Hence, in Figure 3 we focus on male employment because we do not want the unconditional means to be in‡uenced by changes in the gender distribution in the subpopulation over time.

In Figure 2 we first graph the proportion of the respective subpopulation which is full-time employed. We observe that there is less full-time employment in the lower segment of the labor market. Full-time employment for the unskilled fell significantly in the recession years 1976, 1981 and in the recession in the beginning of the 90s. Full-time employment of the skilled only fell temporarily in 1977 resulting from the 3-day work week, but remained fairly constant in the sample period. These results remain qualitatively unchanged for the whole population which is an indication that compositional changes in the gender distribution do not seem to play a role.

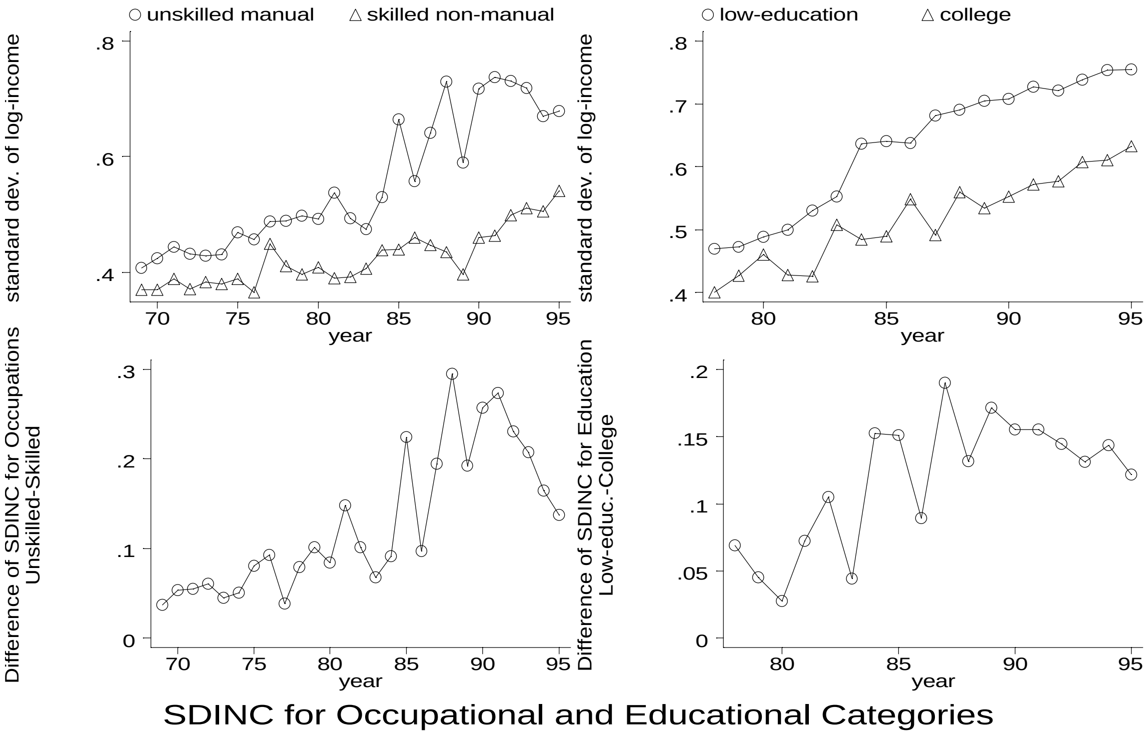

Figure 3: Standard Deviation of Log-Income by Occupation and Education

Second we calculate the standard deviation of log-income[23] of the subpopulations. If labor income shocks are i.i.d. and households within a subpopulation are homogenous, the cross-sectional variance of income will equal the variance of income over time of each household

[23] We use log-income to be able to compare second moments of the distributions.

who belongs to this subpopulation. However, once heterogeneity plays a role this need no longer be true. We need the following assumption to be able to identify di¤erences in the cross-sectional standard deviation as di¤erences in households' income risk.

Assumption 1: The proportion of the cross-sectional variance resulting from heterogeneity is the same in the compared subpopulations.

See Appendix A for a simple proof that this assumption indeed allows identi…cation. Note that this assumption is su¢ cient, but not necessary. Moreover, heterogeneity might very well increase over time as long as it does not increase at very di¤erent rates in the compared subpopulations.

We now provide some illustrative evidence in Figure 3. To account for observable heterogeneity we regress household income on observable demographic and geographic characteristics as cohort membership, marriage, number of children and adults, sex, urban neighborhood and year dummies. We then retrieve the residuals which are at least partially cleaned from heterogeneity. We compare the standard deviation of log-labor income[24] (sdinc) of the unskilled manual and skilled non-manual subpopulation and the well and low-educated, respectively. We also report the results for educational subpopulations to stress the robustness of the results. As can be seen in the upper part of the …gure sdinc is indeed bigger for the unskilled manual and the low-educated. Moreover, sdinc is increasing for all subpopulations which one would expect in a more ‡exible labor market environment.[25] To get an idea whether sdinc increased more for the unskilled and low-educated we plot the di¤erences[26] of the standard deviations of the unskilled and skilled and low and well-educated workers, respectively. There is some evidence that sdinc has increased more for the unskilled and

[24] The results are very similar if we use labor and wealth income as a measure of total income. The labor income ‡uctuations do not seem to be o¤set by the ones of wealth income.

[25] Of course, this could as well be explained by increasing within group heterogeneity.

[26] Note that under Assumption 1 the variation due to heterogeneity will cancel.

low-educated in the 80s. However, the differences become smaller in the 90s.[27] One explanation is that the group of unskilled-manual workers becomes more homogenous over time whereas the opposite is the case for skilled non-manual workers. A possible mechanism is endogenous skill accumulation. Note that Assumption 1 is violated in this scenario and we underestimate the "real" underlying difference in labor income risk over time as plotted in Figure 4.

Figure 4 does not change qualitatively if one does not take account of observable heterogeneity and uses the raw log-income data. This is the case although a considerable amount of variation is explained in the regressions which is an indication that a substantial part of the difference in the standard deviations illustrated in Figure 4 is not resulting from heterogeneity. However, there remain other unobserved sources of heterogeneity which might affect our results.

Having explained how we proxy labor income risk we are now able to outline further identifying assumptions.

B) From the coinsurance rate α to insurance demand

We do not have direct information on the coinsurance rate of households but only on insurance demand.[28] We now mention the necessary assumptions under which the effect of income risk on the coinsurance rate can be identified from the effect on insurance demand. Households demand the amount of motor-vehicle insurance $mvins_{it} = \alpha_{it}\,\mu_{it}\,v_{it}E_t[\delta_{it+1}]$ where, as might be recalled, α is the coinsurance rate, μ is the markup, and δ is the lost proportion of the car-value v. First we have to make an assumption about the distribution of δ.

Assumption 2: The distribution of the proportion of losses δ is the same for both sub-

[27] This result is in line with evidence for the UK provided by Blanchflower and Burgess (1996), Blundell and Preston (1995, 1998), Gregg and Wadsworth (1996), OECD (1997), table 5.3., and Schmitt (1995).

[28] We will argue below that we are able to control for the supply side so that we can identify demand.

populations after controlling for observable individual characteristics. In particular, $E_t^p[\delta_{it+1}|X_{it}] = E_t[\delta_{it+1}|X_{it}]$ where p is a superscript for the respective subpopulation and X_i are observable individual characteristics.

This assumption could be violated if, e.g., unskilled manual workers are worse drivers and hence have a higher expected loss. Then insurance demand of unskilled manual workers would be higher even without any differences in labor income risk. If workers endogenously adjusted their driving behavior, the opposite should be the case, however. Unskilled manual workers with less assets and more income risk would, e.g., drive more carefully. This would induce less insurance demand ceteris paribus. Hence, we will underestimate the effect of higher labor income risk on insurance demand if endogenous behavioral adjustment matters.[29]

An economic argument supporting Assumption 2 is that households rationally adjust their driving behavior and drivers' records are contained in insurance contracts.[30] If unskilled manual workers on average had smaller losses because higher labor income risk induces them to drive more carefully, their premiums would decrease. They would then insure themselves more which would induce them to drive more reckless. The expected loss would rise in equilibrium. This is a specific example where subpopulation characteristics can differ systematically because of differences in labor income risk.

Second we will have to control for the value of the car, v, and look at differences in insurance demand in the respective subpopulation for given v. Furthermore, we will have to control for the fact that different households face different markups. We do not believe that

[29] This might fail to hold, however, if risk aversion is endogenous, i.e., if less risk averse households choose more risky occupations (see Guiso and Paiella (2000)). This is unlikely to play a big role in our application because we exclude the self-employed from our sample.

[30] Note that no information on occupation or household's exposure is necessary. In reality these are not included in insurance contracts. All what is needed is the driver's record which differs, however, because of systematic differences in these characteristics.

the competitiveness of the insurance sector changes for different subpopulations because the insurance market in the UK is well developed in the whole sample period. However, household characteristics such as sex, marital status, age etc. and car characteristics will change the insurance premium. Hence, we can think about the markup as $\mu_{it} = X_{it}\theta + \varepsilon_{it}$. We will control for observable household characteristics influencing the insurance premium. Moreover, we will have to assume the following:

Assumption 3: Unobservable household and car characteristics of each subpopulation only imply a different fix cost of insurance but do not influence the premium proportionally to the value of the car.

Under Assumption 3 we are able to insert dummies for the subpopulation in our equation which will control for the unobservable differences in household and car characteristics. Then we are still able to identify a higher insurance demand per car value as a result of higher labor income risk. This will be captured in our regressions by inserting interactions of subpopulation dummies and the value of the car.

To be more explicit we can write the demand for motor-vehicle insurance $mvins$ as

$$mvins_{pt} = a(\sigma_p; \varepsilon_p) + b(\sigma_p)\, v_{pt} E_t[\delta_{it+1}] \ ,$$

where the subscript p denotes subpopulations, σ is the income variance and ε are unobservable household and car characteristics. Note that ε only influences the intercept, but not the slope parameter. Moreover, note that this assumption is not specific to the use of occupational proxies for income risk. If those exposed to higher income risk differ systemically with respect to car characteristics, drivers records etc. such an identifying assumption is necessary as long as no detailed data on individuals' insurance contracts is available. As we pointed out above, however, driver's records potentially endogenously adjust because of differences in labor income risk.

We will return to this assumption in our discussion of the results.

C) Additional adaptations and sample selection

To control for common changes over time such as changes in the competitiveness of the insurance industry etc. we insert time dummies T_t into the equation. As mentioned above households choose their controls for the given state variables financial wealth, a_{it}, and the vehicle stock, v_{it}. We are now able to rewrite (1) in the following way:

$$0 = g\,(mvins_{it}; v_{it}; a_{it}; X_{it}; T_t): \tag{2}$$

Recall from our theoretical model that it is possible that households do not have any cars. Then we do not observe demand for car insurance. Hence we estimate the following equation[31]:

$$mvins_{it} = \begin{cases} 0 & \text{, if } v_{it} = 0 \\ Z_{it}\gamma + u_{it} & \text{, if } v_{it} > 0 \end{cases}$$

where Z contains v_{it}, a_{it}, X_{it}, and T_t. Moreover, it is unlikely that those households having no car have the same characteristics as households owning a car. Our model would predict that households owning no car are poorer and potentially exposed to more income risk.[32] This means that we will have to control for selection.

D) Identifying effects of changes in labor market regimes

Let us now point out what assumption we need to identify effects of different labor market regimes.

[31] We implicitly assume that $g(:)$ in (2) is separable in its arguments, $g^{-1}(:)$ exists, and $g^{-1}g$ leaves us with a linear equation. None of the above is correct because the Euler equation does not have a closed form solution. Hence, the estimated equation is better thought of as a reduced form since it cannot be rigorously derived from the Euler equation. However, the specification is determined by the model we presented above.

[32] In our discussion here we neglect the possibility that households have company cars and thus do not own a car. This is done for the purpose of simplicity and because our model has nothing to say on this issue. The estimations, however, take account of any kind of linear selection.

Assumption 4: The risk aversion of the subpopulation considered does not change with respect to the rest of the population.

Common changes of risk aversion will be controlled by time dummies. However, changes in the composition of the subpopulations over time could potentially change the risk aversion of that subpopulation. One potential channel would be endogenous human capital accumulation. If unskilled workers perceive themselves more at risk, they will upgrade their skills. Hence, only the unable or less risk averse remain unskilled. Below we address this issue by investigating whether our results are robust once we exclude all individuals who enter the labor market after 1980. The idea is that if individuals leave education and become employed, it will be more difficult to upgrade skills.

Another channel through which the risk aversion of the subpopulations might change with respect to the rest of the population is, e.g., when more unskilled or low-educated select into the group of those buying a positive amount of insurance by buying a car. This is because we can only control for risk aversion if it is correlated with observables. If those with a more risky labor income refrained from buying a car in the beginning of the period, but do so towards the end because of easier credit access, then there should be more insurance demand for a given exposure towards the end of the period even without any effect of the labor market environment. Hence, it is important to control for selection in our estimation. For the skilled or well-educated selection issues arise if households do not buy insurance because of company cars. We will discuss deviations from Assumption 4 and their implications for the interpretation of the estimates further when we present our results.

After having stated the identifying assumptions we want to give a brief introduction to the market for car insurance in the UK and the data before we present our results.

4 The Insurance Market in the UK

The insurance sector in the UK was well developed already before 1979 as noted by Finsinger et al. (1985), p. 105. This is confirmed by suggestive evidence from OECD-data for the years 1983-96 on the penetration ratio for non-life insurance which is defined as direct gross premiums over GDP. This is an indicator for the importance of the domestic insurance industry. The penetration ratio is 4.1% in 1984 compared to 4.6% in 1996. Its smallest value is 3.6% in 1983 and the maximum is 5.3% in 1993. Hence there is no clear sign that the insurance industry has become much more important during the eighties. Moreover, the data reveals that the insurance industry in the UK has always been the most developed in Europe in the period 1983-96.

We focus on motor-vehicle insurance because the data allows us to control for households' self-protective actions.[33] This is crucial for the analysis because households who face higher labor income risk might simply lower their exposure by decreasing their worth exposed to risk instead of buying more insurance. In the context of motor-vehicle insurance that means buying a cheaper car. Since cars account for around 85% of the vehicle stock in our sample period (Department of Environment, Transport and the Regions (1997)), constructing a proxy for the value of the stock of cars will allow us to control for these self-protective actions. Additionally, the motor-vehicle insurance market has a considerable depth because every household owning a car is obliged to buy a minimum amount of insurance. More than 50%, at the end of the sample about 70%, of the households demand a positive amount of motor-vehicle insurance. The minimum insurance is far from complete because there exists a variety of additional coverage possibilities which leaves us with enough variation.

[33] To be able to do a partial analysis of the insurance market for motor-vehicles we have to assume that the correlation between losses connected to different risks remains the same as income risk increases (see section 2). If for example higher income risk is accompanied by a weaker positive or more negative correlation of risk connected to motor-vehicles with other insurable risks, we will not observe a higher insurance demand.

The Road Traffic Act requires all motorists to be insured against liabilities for third parties only. Current information of the Association of British Insurers (1998) on motor-vehicle insurance reveals that two thirds of the motorists demand comprehensive coverage, most of the rest insures against third-party liabilities, fire and theft and a very small proportion of the population demands only the obligatory insurance coverage.[34]

We now want to describe our data sources and sample more explicitly.

5 The Data

Because idiosyncratic risk by definition washes out in the aggregate the use of micro data is essential for the questions we are interested in. We use the Family Expenditure Survey (FES) and National Travel Survey (NTS) for the UK. Merging these data sets gives us information on labor market characteristics and insurance expenditure. Moreover, we are able to control for households' exposure in the insurable risk. Finally, the sample period 1969-96 allows us to investigate the effects of changes in the labor and financial market in the UK after 1979.

The Family Expenditure Survey (FES) '68-'96 for the UK is a repeated cross-sectional survey of around 7,000 households per year.[35] The data is collected by face-to-face interview or diaries. The survey contains information on motor-vehicle insurance, income, consumption, geographic and demographic variables. See Appendix B for a description of the variables and their abbreviations. Since we are dealing with a survey, we have to consider

[34] Hence, it is unlikely that our results are affected by the fact that we are not able to identify the amount of obligatory insurance to be paid by every household. This amount will depend on the drivers record, type of car etc., i.e., information which is not available in the data we have. Once we find that households with more risky occupations demand more insurance this could be alternatively explained by a higher average obligatory insurance premium for this subpopulation. This is a specific example of a violation of Assumption 3.

[35] 10,000 households are initially contacted whose response rate is 70%. We assume in our analysis that nonwithstanding the non-response of some households our sample remains representative. Then conditioning on the selection should not alter our results. See Verbeek and Nijman (1992) for a discussion.

underreporting of certain measures which is not necessarily random across the population, and other sources of measurement error. However, Atkinson and Micklewright (1983) report that underreporting is only substantial for investment income, the income of self-employed and alcohol consumption. The reliability of the FES is confirmed for later years by the papers in Banks and Johnson (1998). Underreportings and biases are reasonably constant so that changes over time are interpretable. Additionally, we will use the National Travel Survey (NTS) to impute the value of the car. For details concerning the construction of the variables valcar, urban and the issue of company cars see our companion paper (Koeniger (2000)) which is available upon request.

Our sample is constructed as follows. We exclude households from the sample where either the household head or his partner are self-employed. As mentioned above self-employed tend to substantially underreport income. Furthermore, the self-employed tend to be less risk-averse (Skinner (1988), Guiso and Paiella (2000)) and we are not interested in differences in insurance demand which result from differences in risk aversion. Moreover, if the vehicle stock used by the self-employed is used for their business, then their labor income risk and the risk associated with the vehicle stock are positively correlated. We have no information on the type and size of the business risk in the data. Hence, if we found that the self-employed demanded more insurance, we could not identify whether this would be resulting from higher labor income risk or a stronger positive correlation between the two sources of risk. In this paper we are interested in the former. We exclude households where the household head is retired or older than 53 since the consequences of income risk become negligible close to the retirement age.[36] Moreover, health risk is more important for older households and might affect car ownership rates. We exclude households who report zero food consumption. Finally, we exclude households from Northern Ireland because it is too different from the rest of the UK in many respects.

[36] The usual retirement age is 65 (60) years for males (females).

The monetary income variables are converted to real terms using the retail price index and the price index for motor-vehicle tax and insurance[37] which is constructed by the O¢ce for National Statistics using the FES.[38] We normalize the monetary variables and the number of owned cars by household size dividing by the following adjustment factor: #of adults + 0.5* #children.[39] We aggregate individual monetary variables to the household level because otherwise we have the measurement problem that individual income, consumption or wealth can in principle be arbitrarily shifted across household members in our survey.[40] Hence, idiosyncratic risk which is eliminated within the household is neglected in our analysis. Assuming perfect within household insurance would eliminate the problem we would like to analyze. As Dynarski and Gruber (1997) point out, however, within household insurance is non-negligible in the US, but fails to eliminate all idiosyncratic risk.

We report sample averages of the subpopulations in our companion paper. The same holds for a more explicit presentation of the econometric methodology which is similar to, e.g., Blundell, Duncan and Meghir (1998). Let us now brie‡y turn to the controls we choose before we report the results.

[37] Before 1974 we have to use the price index for motoring.

[38] Ideally, one would want to construct an expenditure and region speci…c in‡ation index for every household. Unfortunately, the necessary data is not available for the sample period we want to analyze. We use the respective price index with a monthly frequency and de‡ate the data in the following way: monetary variables are de‡ated by the average respective price index of the year preceding the interview date. This is done because it is not possible to …nd out when income is obtained or insurance premiums are actually paid in the year preceding the interview.

[39] This procedure is akin to that in Blundell, Browning, and Meghir (1994) who choose the formula #of adults + 0.4* #children. Our results are robust to variations of the adjustment formula.

[40] The problem of intra-household bargaining is not explicitly adressed. However, we introduce marriage as a control which probably captures whether households are in a cooperative or non-cooperative equilibrium.

5.1 Choice of Controls

Some of the controls are supposed to control for supply-side effects, others for demand-side effects. We will use controls for the whole population and the subpopulation because we do not want our results for the subpopulation to be driven by demographic differences.

a) adults: the number of adults using the car will determine the insurance premium. We expect the coefficient to be positive.

b) married: married households might have a stronger commitment to share income sources and thus provide more intra-household insurance. Moreover, married households are more likely to buy family cars which are in general cheaper to insure. We expect the sign to be negative.

c) sex: women often get charged less for insurance; we thus expect a negative sign.

d) consumption: consumption serves as a proxy for financial wealth. We expect a negative sign, given that we control for the value of the car. Let us now briefly discuss the advantage of using consumption instead of wealth income in our regression.[41] Firstly, consumption is very accurately measured in the FES compared to wealth income. Moreover, wealth income mixes effects of the fluctuations of the stock of wealth and its return. The disadvantage of using consumption is that once precautionary motives matter, current consumption is not necessarily a good proxy of total financial wealth because it also reflects the perceived uncertainty of future income. Moreover, the accuracy of consumption as a proxy differs across wealth levels. Theory tells us it should be a good proxy for wealthy households for whom precautionary motives matter less, but probably a bad one for poor ones. Given the data we have we still prefer consumption over wealth income. We will discuss this issue more when we report our estimation results.

e) valcar: We expect the sign to be positive because more exposure increases insurance

[41] We do not impute the stock of household's wealth from wealth income because wealth income is reported too aggregated in the FES. Hence, the imputed stock of wealth would be too error-ridden.

demand.

f) urban: living in an urban neighborhood increases the insurance premium; we expect a positive sign.

One shortcoming is that postal codes seem to be a determinant of insurance premiums in the UK, presumably because they proxy the safety of the neighborhood, the amount of tra¢c etc. Firstly, we have postal codes for some years only and secondly we do not have information how to match them to premiums. However, the quality of the neighborhood is probably correlated with wealth, a variable we control for. This should reinforce the negative sign for the consumption variable, once we control for the value of the car.

g) cohort dummies: We use cohort dummies to control for …xed e¤ects in our data. This is standard in the estimation of repeated cross-sectional data and explained more in our companion paper. We choose …ve-year age cohorts to estimate the cohort …xed e¤ect with enough precision.

We now have all the prerequisites to turn to the results of our estimations.

6 Results

We focus on insurance demand and not on portfolio choice because the FES contains only information on investment income and not on stocks of risky assets. It is also likely that the wave of privatizations after 1979 (see Table 1) has in‡uenced the portfolio composition of households so that it is impossible to identify the e¤ects of labor market regime changes from e¤ects of the privatization wave on the demand of risky assets. However, estimates for the e¤ect of labor income risk on participation in the stock market which are reported in our companion paper con…rm results in Haliassos and Bertaut (1995) for the US and are in line with results of Attanasio (1998) on stock market participation in the UK.

6.1 Insurance Demand and Income Risk

We will present the estimation for the whole sample with the occupational proxy of labor income risk and a test for di¤erent coe¢cients in the 80s and 90s.

Estimation Results

We estimate a Heckman selection model where the instruments are cohort-year interaction dummies. We report the F-statistic for joint signi…cance of the instruments. The instruments are clearly not perfect since age –which is a particular linear combination of cohort-year interactions– is likely to violate the exclusion restriction. I.e., age should predict car ownership and positive insurance demand, but not the size of insurance demand.[42] Hence, we also estimate a simple tobit model which does not control for selection. Fortunately, the results are unchanged.

We omit the year and cohort dummies in the output, but report joint F-statistics for their signi…cance. The output for the selection equation is documented in Table 3.[43] The estimation requires to make an intestable identifying assumption on the distribution. We assume, as is usually done, that the error terms of the selection equation and the equation for insurance demand are jointly normally distributed. The results are summarized in Tables 3 and 4. The last column displays the quantitative e¤ect of the respective variable on insurance demand.

Table 2 reports the results for the whole subsample with occupational proxies for labor income risk. We want to focus on the variables in bold font …rst. Motor-vehicle insurance is

[42] The exclusion restriction is also violated for other plausible variable like distance to work, usage of public transport etc.

[43] Note that selection plays a signi…cant role. This is indicated by the test for independence of the main and selection equation. The variables as, e.g., coh5y10d91 are the instruments. E.g., coh5y10d91 means the 10th cohorts' dummy interacted with the year dummy for 1991. Of course, not all possible interactions are inserted because this would result in perfect collinearity. Recall from the main paper that the F-test for insigni…cance of the instruments can be rejected at conventional signi…cance levels.

a slightly concave function of the value of the car. The coefficient of valcar is positive and the one of valcar2 is negative. The concavity becomes less pronounced in the 80s and 90s as can be seen from the coefficients of valcar80 and valca280. The concavity is negligible in the range of car values we are interested in so that we will focus on the coefficients of the linear terms. For a car worth 520 pounds which is the sample average[44] households pay 148 pounds of insurance in the 70s and 127 pounds in the 80s and 90s. Unskilled manual workers (unskman) demand significantly less motor-vehicle insurance in the 70s and this does not change significantly in the 80s and 90s (unsk80). Skilled non-manual workers demand significantly more motor-vehicle insurance than the rest of the population in the 80s and 90s (sknman, skn80). Recall that the subpopulation dummies shall capture unobservable differences in car characteristics (e.g., sports cars) and in individual characteristics influencing the premium (e.g., driving records, risk aversion).

Let us now interpret the coefficients we are mainly interested in. Unskilled manual workers demand 15 pence more insurance per pound of car value (unsvcar) and 9 pence more in the 80s and 90s (unsvca80). Moreover, this effect decreases as the value of the car increases (unsvc2,unvc802). Hence, labor income risk seems to play a smaller role for car insurance once households own more valuable cars. Richer households can buffer income fluctuations more easily. Skilled non-manual workers buy 3 pence less insurance per pound of car value (skvcar) and this effect increases by 2/3 in the 80s and 90s (sknvca80). In light of the relative decrease in the coefficient of variation of income of skilled non-manual workers in the 80s and 90s this effect is consistent with the theory when regularity conditions are imposed on the utility function. The asymmetry of changes in the coefficients in the 80s and 90s for unskilled and skilled workers might result from easier credit access in the 80s. If unskilled manual workers were more likely to be liquidity constrained in the 70s than skilled workers, easier credit access in the 80s might offset the effects of increases in labor income

[44] Recall that monetary variables are normalized by household size. The average car values are consistent with those reported by Davies, Devereux and Weber (1992).

risk on insurance. Moreover, for skilled workers insurance demand is a less concave function of the value of the car (skvc2, skvc802) than for unskilled manual workers (unsvc2,unvc802). Because of the smaller labor income risk varying the value of the car matters less for the insurance decision.

Note that most other variables have the expected sign. The exception is the sign of consumption (ln ndc) which is positively significant. This can be rationalized theoretically in the following specific case. Imagine two types of households: type 1 is wealthy and exposed to high labor income risk whereas type 2 is poor and exposed to low labor income risk. Higher wealth induces more consumption whereas higher uncertainty reduces consumption. If the first effect outweighs the second, consumption of type 1 will be bigger than consumption of type 2. If wealth does not decrease the risk vulnerability of households too much, they will demand more insurance. Hence, we get a positive correlation between consumption and insurance. We acknowledge that this is a rather special case. However, recall that the coefficient of consumption has to be interpreted keeping the other variables in the regression constant.

Alternatively, higher labor income risk in the 80s and 90s might have induced households to accumulate more assets so that those more exposed to risk end up with a higher stock of wealth and demand more insurance. It is difficult to further interpret the change of the sign because the data does not allow us to fully address dynamics. Hence, it is impossible to disentangle the direction of causation.

Another more practical explanation is that consumption picks up unobservable car and individual characteristics of more wealthy households. E.g., more wealthy households might be more likely to buy sports cars or drive more risky because a potential loss does not hurt them as much.

We summarize the main result in Figure 4. Using our parameter estimates we plot insurance demand as a function of the car-value for the unskilled (the curve with the smaller intercept) and skilled workers (the curve with the bigger intercept), respectively. For the rest of the population we normalize the demand for insurance to zero at a car value of zero. The relationship between car insurance and the value of the car is nearly linear for all subpopulations. The di¤erence between the curves narrows between subpopulations as the value of the car increases until a car value of roughly 140 pounds per household size and then again widens. The average car value per household size for the unskilled is 262 (386), for the skilled 984 (735) and for the average population it is 670 (652). Standard deviations are reported in brackets. Hence, unskilled manual workers are exposed to more labor income risk and not surprisingly also have less valuable cars on average.

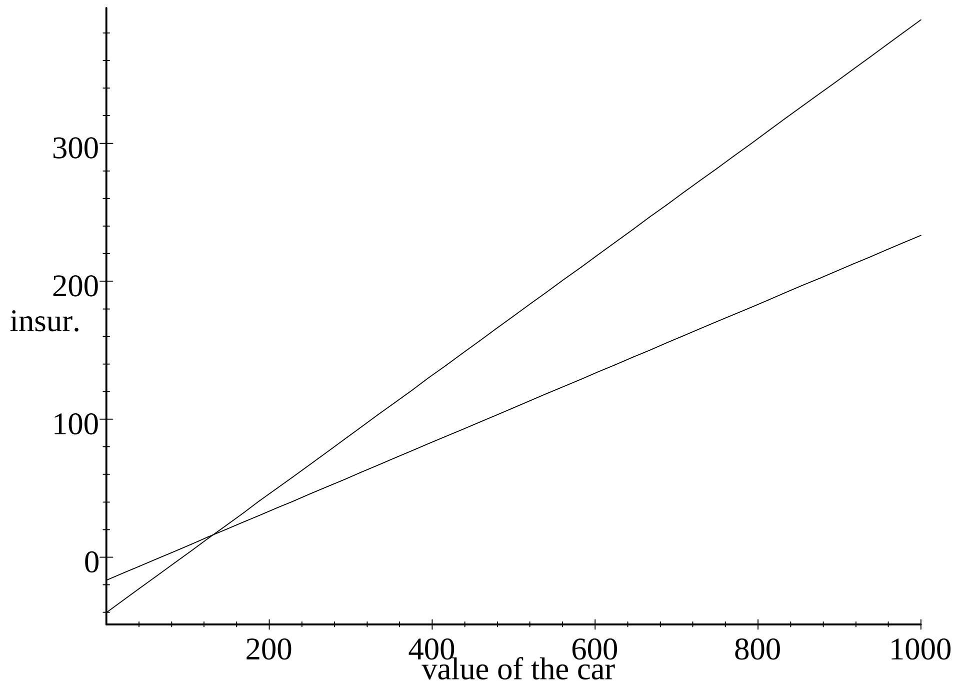

Figure 4: Insurance as a Function of the Car Value: Skilled and Unskilled

Size of the E¤ects and Macro-Importance

In Table 5 we calculate the size of the di¤erence in insurance demand over the di¤erence in the coe¢ cient of variation. We only do so for the occupational proxies because they have signi…cant coe¢ cients. In the upper part of the table we report the coe¢ cients of variation of income for the respective subpopulation for the following sample periods: 1969-95, 1969-78, and 1979-95. As already noted in Figure 3 the gap between the coefficient of variation of income of the unskilled and skilled widens in the 80s and 90s. As is apparent from the third and fourth row the ratio of differences in insurance demand over differences in the coefficient of variation became smaller over time. The numbers can be used for the following thought experiment: If the coefficient of variation for the unskilled decreased by .01, their insurance demand would decrease by approximately 30 pence per pound of car in 1969-78, but only by 9 pence per pound of car value in 1979-95. Under our identifying assumption that variation resulting from heterogeneity is the same fraction of the overall variation for both subpopulations this suggests households benefitted from alternative means of insurance as, e.g., provided by easier credit access in the 80s and 90s.[45]

Moreover, we want to briefly investigate whether the estimated effects are important on a macro level. Hence, we weight the ratios with the proportion of the unskilled manual and skilled non-manual workers, respectively. For the unskilled manual the effect of changes in the coefficient of variation in income become negligible for the aggregate. Moreover, they become even smaller over time because the fraction of the population which is unskilled decreases over time which is consistent with endogenous skill accumulation as a way to reduce labor income risk. For the skilled non-manual the effect becomes smaller over time, but less so because the fraction of skilled non-manual workers in the population increases. Overall it seems that the effects do not matter for the aggregate at least in the 80s and 90s potentially because of a more efficient financial market.[46]

[45] The qualitative statement is fairly robust. To illustrate this let us assume that heterogeneity plays no role for the increase of the coefficient of variation of the skilled. Then after taking heterogeneity into account the observed 39% increase of the coefficient of variation of the unskilled would have to become at least a "real" 2% decrease for the statement to be wrong.

[46] However, we want to point the following caveat. Because of a smaller sample size for the unskilled manual workers the results could be as well resulting from heterogeneity because of finite samples.

Robustness

We first investigate whether our results are robust when we drop employees of the public and financial service sector from our sample. This is because Finsinger et al. (1985) report that some insurance companies give premium discounts for these sectors. It turns out that our results are qualitatively similar and are reported in our companion paper.

Second we try to assess whether endogenous skill accumulation matters. Recall that our crude strategy is to drop all households in the sample whose household head was younger than 25 years old in 1979 because it is more difficult to upgrade skills while being in the labor market. To generate the same age structure in both subsamples we adjust the first half of the sample in the same way. Again the results do not change much quantitatively and are reported in our companion paper. Note, however, that we are not able to identify the effect resulting from changes in the age structure of the adjusted sample from the selection effect.

Selection issues might also arise because of changes in the population of car owners, i.e., those who demand a positive amount of insurance. It turns out that car ownership for the unskilled manual workers increases significantly in the sample period: from 32% to 53% with the biggest increase of 13 percentage points in 1982 when downpayment requirements for car purchases fell significantly. In our model those not owning a car are households with lower wealth and more risky labor income. If these households are more likely to own a car towards the end of the sample insurance demand should increase in the 80s and 90s. Hence, we can interpret our estimate for the 80s and 90s as an upper bound which implies that the effect of more flexible financial markets is possibly even more pronounced.

The percentage of skilled owning a car is nearly constant around 25% in the whole sample. The composition changes, however. Whereas company car ownership does not play a role for unskilled manual workers it does for skilled manual workers. The percentage of skilled having company cars increases from 20% to 40% in the sample period. However, after 1981 more than half of the households with company cars own an additional car whereas this is the case for only 20% at the beginning of the sample. Hence, those of the skilled who do own a car because they are provided with a company car are on average wealthier towards the end of the sample. This should at least partly be picked up by our control for wealth of the skilled subpopulation.

Third we use wealth interest income instead of food consumption as a proxy for wealth. The results remain quantitatively robust. Interestingly, also the coe¢cient for wealth interest income has a positive and signi…cant sign.

Finally, our results are robust with respect to di¤erent years used to split the sample. The results are also robust, if we only use the sample of male household heads. Before we conclude let us now mention alternative interpretations of our estimation results.

Alternative Explanations

Of course, there will exist alternative interpretations of our estimation results if one of our identifying assumptions is violated.

1. If Assumption 3 or Assumption 2 is violated, unobservable car- and household characteristics in‡uence the marginal demand of insurance with respect to the value of the car. Under the hypothesis that unskilled manual workers are exposed to higher income risk and that this induces higher insurance demand, we cannot identify what fraction of higher insurance demand of the unskilled is resulting from higher labor income risk or unobservable car- or household characteristics. Without a data set which contains detailed information on households' insurance contracts, car characteristics and labor income it is impossible to address this question in further depth.[47] However, this paper made a step forward compared to the previous literature by controlling for the exposure of households, i.e., the value of the car.

[47] Note again that the identi…cation problem would occur not only with occupational proxies of labor income risk, but also with income risk proxies constructed from a panel data set.

Once unobservable characteristics are considered an important factor it would be useful to know how they are di¤erent and whether economics has something to say on this issue. For given levels of risk aversion the subpopulation exposed to higher labor income risk –the unskilled manual workers– should self protect more. I.e., members of this subpopulation should drive more carefully, buy less risky cars etc. As soon as these self-protective actions partly substitute for insurance demand this should bias the estimated e¤ect of labor income risk on insurance demand downward.

However, Guiso and Paiella (2000) …nd some empirical support for the hypothesis that occupational choice is endogenous. Riskier occupations are done by less risk averse people. This e¤ect leads to opposite predictions on self-protective behavior and tends to o¤set the e¤ects pointed out above. Hence, from an economic perspective it is unclear whether the unskilled-manual workers have unobservable car and household characteristics which bias the estimates up or downward. However, endogeneity of occupational choice is unlikely to be very important because we exclude self employed from our sample.

2. Alternatively to deregulated …nancial markets, endogeneity might be the reason for the decreasing e¤ect of labor income risk on insurance demand in the 80s and 90s if Assumption 4 is violated. Given that income risk of unskilled-manual workers increased relative to the rest of the population over time (see Figure 4), unskilled-manual workers will be relatively less risk averse on average towards the end of the sample if self selection plays a role. Hence, they will demand less insurance for a given labor income risk. However, this e¤ect would need to outweigh the increase in insurance demand resulting from higher income risk in the 80s and 90s compared to the 70s. Moreover, endogeneity should induce an increase in insurance demand for the skilled as more risk averse households select into this subpopulation. However, this is the opposite of what we …nd.

3. It is unclear whether unskilled manual workers demand more or less insurance, if they are less informed than skilled workers. On the one hand they might participate less in the

insurance market and thus demand less insurance. On the other hand they might be charged a higher mark-up because they are less informed. If their demand is sufficiently inelastic this will imply a higher insurance demand.

Having discussed alternative interpretations of our results we conclude.

7 Conclusions

The prediction of the theory that an increase in labor income risk lets households insure more against independent, insurable risks is supported by our empirical evidence. The effect plays a role on a household level but is negligible on the aggregate level in the 80s and 90s. This suggests that more liberal financial markets mitigated the effects of higher labor income risk. Unskilled manual workers who are exposed to higher labor income risk demand significantly more car insurance whereas skilled non-manual workers who are exposed to less labor income risk demand less car insurance for a given value of the car.

As we pointed out above we do not take account of dynamic general equilibrium effects in our estimations, but only answer the more moderate question whether households with a higher labor income risk demand more insurance conditional on wealth and the value of the car.

Gakidis (1998) and Viceira (1999) point out that it is not clear whether higher labor income risk increases insurance demand in an dynamic context. This is because higher labor income risk might induce more wealth accumulation which in turn can decrease the propensity to insure. Although theoretically possible this does not seem to hold for plausible parameter values as Gakidis shows.

Policy implications

First since unskilled manual workers do not seem to have the means to considerably self-insure there is scope for policies directed to help these subpopulations in a more flexible environment. Policies seem to be viable because whole subpopulations are affected so that insurance provision could avoid the problem of moral hazard by using subpopulation characteristics to specify the insurance contracts. However, policies providing more insurance for the unskilled potentially have adverse incentive e¤ects for the members of these subpopulations to endogenously select out of these by skill acquisition. Hence moderate support seems to be advisable. One policy example suggested by our evidence is to deregulate …nancial markets. This should bene…t unskilled workers more than skilled non-manual because the former are more likely to be liquidity constrained. With deregulated …nancial markets higher labor income risk seems to imply rather small welfare costs for risk averse households.

Second the e¤ects of labor income risk on risk-taking seem to be negligible if …nancial markets o¤er e¢cient ways to bu¤er adverse income shocks. Hence, after rendering …nancial markets more ‡exible in the last decade labor market reforms in continental Europe are unlikely to create high welfare costs for households.

8 Appendix

8.1 Appendix A

We want to show the following: If the fraction of the cross-sectional coe¢cient of variation resulting from heterogeneity is the same in two compared subpopulations, we will be able to identify relative movements in the cross-sectional coe¢cient of variation as movements in the coe¢cient of variation over time between households belonging to the subpopulations.

Proof:

De…ne $var(y_t^k) \equiv var(y_t^{h;k}) + var(f_t^k)$ where the cross-sectional variance of group k, $var(y_t^k)$, is decomposed into the cross-sectional variance of the hypothetical homogeneous group, $var(y_t^{h;k})$, and the part of the cross-sectional variance resulting from heterogeneity, $var(f_t^k)$. Note that $var(y_t^{h;k})$ and $var(f_t^k)$ are orthogonal by de…nition. For two groups k and l the following must hold:

$$1 = \frac{var(y_t^{h;k}) + var(f_t^k)}{var(y_t^k)} = \frac{var(y^{h;l}) + var(f_t^l)}{var(y_t^l)} = 1 .$$

Now if

$$\frac{var(f_t^k)}{var(y_t^k)} = \frac{var(f_t^l)}{var(y_t^l)},$$

then

$$\frac{var(y_t^{h;k})}{var(y_t^k)} = \frac{var(y^{h;l})}{var(y_t^l)} .$$

That means that $var(y_t^{h;k}) > var(y^{h;l})$ ( ) $var(y_t^k) > var(y_t^l)$ which is what we wanted to show. Note that the same holds for the respective coe¢cient of variations by replacing var(:) by cv(:).¥

8.2 Appendix B

Variable De…nitions:

adults = noinHH-children

children: persons below the age of 18 living in the household

college: dummy=1, if the household head was older than 20 when she left full-time education

lnndc: logarithm of households' non-durable expenditure excluding expenditure for motor-vehicle services and repairs, and transport as classi…ed by the FES.

lowed: dummy=1, if the household head was younger than 17 when she left full-time education

married: dummy=1, if husband/wife in household

noinHH: number of persons living in the household

sex: dummy =1, if the household head is female

Rmvins: motor vehicle insurance premiums paid last year sknman: dummy=1, if household head does skilled non-manual manual work

unskman: dummy=1, if household head does unskilled manual work

urban: regional dummy =1 if the household lives in the regions of Greater London or NorthWest

valcar: value of the stock of cars in the household

interaction variables: e.g., unsvcar = unskman*valcar or unsvca80 =unskman*valcar*eighties, or unsvcar2 =unskman*valcar*valcar.

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Table 1:
Institutional Changes in the UK in the 80s and 90s

Labor Market Reforms '80-'93 *

Institutional Change	*Year*
Reduction of coverage and generosity of unemployment benefit	80s
Abolition of statutory recognition, limits on picketing	1980
Extension of grounds to refuse joining union	1980
Employers allowed to refuse contracting with union	1982
Substantial weakening of closed shop rules	1982
Weakening of union immunities; pre-strike ballots	1984
Restart programmes (interviews to long-term unemployed)	1986
Longer tenure to claim unfair dismissal	1988
Further weakening of union immunities	1988
Extension of individual right to work against will of union	1988
Restrictions to right to paid time-off for union representatives	1989
Abolition of wage councils	1993

* copied as in Bertola and Ichino (1995), table 7, p. 390.

The Main UK Privatizations '79-'91 **

Company	*Gross Proceeds (in million pounds)*	*Year*
British Petroleum	290.4	1979
British Aerospace	148.6	1981
Cable and Wireless	223.9	1981
Amersham International	71.0	1982
Britoil	548.8	1982
Associated British Ports	52.4	1983
British Petroleum	565.5	1983
Cable and Wireless	275.0	1983
Associated British Ports	52.4	1984
Enterprise Oil	392.2	1984
Jaguar	293.5	1984
British Telecom	3,915.6	1984
British Aerospace	550.7	1985
Britoil	448.8	1985
Cable and Wireless	932.9	1985
British Gas	5,434.4	1986
British Airways	900.3	1987
Rolls Royce	1,362.5	1987
British Airports Authority	1,281.3	1987
British Petroleum	5,727.0	1987
British Steel Corporation	2,482.0	1988
Water Authorities	5,240.0	1989
Electricity Distribution Companies	5,200.0	1990
Electricity Generation Companies	2,200.0	1991
Scottish Electricity Companies	2,900.0	1991
British Telecom	5,350.0	1991
Sum	46,839.2	

** copied from Moran and Prosser (1994), table 3.2, p. 38. Today also British Rail is privatized (only the tracks and station owned by the state), and there are plans to privatize the London regional transport, too. Thus the only big companies still owned by the state are British Coal and the Post Office.

The Main Changes in British Financial Regulation since 1979 ***

Change	*Year*
Ending of guidelines limiting mortgage lending by building societies	1979
Ending of exchange controls	1979
Ending of the corset (Supplementary Special Deposit Scheme) introduced to curb investment	1980
Abolition of reserve asset requirement requiring banks to lodge at least 12.5% of their deposits in a specified range of liquid assets	1981
Ending of hire purchase restrictions	1982
Collapse of the building societies cartel	1983
Building societies given access to wholesale money markets	1983
Big Bang opening up trading in the City of London	1986
Building Societies Act	1986
Financial Services Act	1986
Schedule 8 clarifies Building Societies Act	1987
Withdrawal of mortgage lending guidelines	1988
The abolition of Control of Borrowing Order	1989
Composite tax on building society deposits abolished. Deposits charged at basic rate of tax.	1991
Announced that new powers to be granted to building societies as part of review of 1986 Act. Societies can increase their activities on wholesale money markets, own life insurance companies and expand their non-property lending.	1994

*** copied from Neill Marshall (1996), table 3.3, p. 69.

TABLE 2

Heckman Selection Model 1969-95 with Occupational Risk Proxies

Nobs:	84,705	*Cens. Obs.:*	27,653	*Unc. Obs.:*	57,052		
Loglik.	-353,966						
	Dependent Variable:		Motor Vehicle Insurance				
	Coef.	***Std.Err.***	***z***	***P>z***	***Effect***	***Unit***	
valcar	**0.282**	**0.00**	**61.26**	**0.00**	**0.28**	pounds of insurance/pounds of carvalue	
valcar80	**-0.036**	**0.01**	**-6.90**	**0.00**	**-0.04**	pounds of insurance/pounds of carvalue	
valcar2	**0.000**	**0.00**	**-27.84**	**0.00**	**0.00**	pounds of insurance/pounds of carvalue	
valca280	**0.000**	**0.00**	**10.58**	**0.00**	**0.00**	pounds of insurance/pounds of carvalue	
married	-53.789	3.48	-15.47	0.00	-53.79	pounds/year	
marrd80	-3.365	3.93	-0.86	0.39	-3.37	pounds/year	
sex	-11.615	4.00	-2.91	0.00	-11.61	pounds/year	
sex80	-19.507	4.51	-4.33	0.00	-19.51	pounds/year	
adults	12.817	1.45	8.83	0.00	12.82	pounds/year	
adults80	14.209	1.77	8.02	0.00	14.21	pounds/year	
lnndc	12.561	0.98	12.87	0.00	3	pounds of insurance/pounds of consumption	
lnndc80	2.715	0.69	3.92	0.00	1	pounds of insurance/pounds of consumption	
urban	7.343	1.79	4.11	0.00	7.34	pounds/year	
urban80	4.195	2.29	1.83	0.07	4.20	pounds/year	
unskman	**-36.139**	**16.06**	**-2.25**	**0.02**	**-36.14**	pounds/year	
unsk80	**12.387**	**20.13**	**0.62**	**0.54**	**12.39**	pounds/year	
unvcar	**0.148**	**0.02**	**6.84**	**0.00**	**0.15**	pounds of insurance/pounds of carvalue	
unsvca80	**-0.060**	**0.03**	**-2.17**	**0.03**	**-0.06**	pounds of insurance/pounds of carvalue	
unvcar2	**0.000**	**0.00**	**-5.67**	**0.00**	**0.00**	pounds of insurance/pounds of carvalue	
unvc280	**0.000**	**0.00**	**2.45**	**0.01**	**0.00**	pounds of insurance/pounds of carvalue	
unsmar	19.873	12.66	1.57	0.12	19.87	pounds/year	
unsma80	-6.144	15.55	-0.40	0.69	-6.14	pounds/year	
unssex	-3.191	17.73	-0.18	0.86	-3.19	pounds/year	
unsse80	15.351	20.80	0.74	0.46	15.35	pounds/year	
unsad	2.581	5.01	0.52	0.61	2.58	pounds/year	
unsad80	2.750	6.74	0.41	0.68	2.75	pounds/year	
unsndc	0.000	0.00	-0.09	0.93	0.00	pounds of insurance/pounds of consumption	
unsndc80	-0.003	0.00	-1.16	0.25	0.00	pounds of insurance/pounds of consumption	
unsurb	-0.267	7.22	-0.04	0.97	-0.27	pounds/year	
unsurb80	4.030	10.36	0.39	0.70	4.03	pounds/year	
sknman	**-6.641**	**8.66**	**-0.77**	**0.44**	-6.64	pounds/year	
skn80	**21.880**	**10.12**	**2.16**	**0.03**	21.88	pounds/year	
skvcar	**-0.031**	**0.01**	**-3.57**	**0.00**	-0.03	pounds of insurance/pounds of carvalue	
sknvca80	**-0.024**	**0.01**	**-2.36**	**0.02**	-0.02	pounds of insurance/pounds of carvalue	
skvcar2	**0.000**	**0.00**	**5.50**	**0.00**	0.00	pounds of insurance/pounds of carvalue	
skvc280	**0.000**	**0.00**	**-0.73**	**0.47**	0.00	pounds of insurance/pounds of carvalue	
sknmar	-13.398	6.90	-1.94	0.05	-13.40	pounds/year	
sknma80	-6.052	7.75	-0.78	0.44	-6.05	pounds/year	
sknsex	-27.379	8.91	-3.07	0.00	-27.38	pounds/year	
sknse80	32.522	10.02	3.25	0.00	32.52	pounds/year	
sknad	-3.602	3.05	-1.18	0.24	-3.60	pounds/year	
sknad80	3.054	3.69	0.83	0.41	3.05	pounds/year	
sknndc	0.000	0.00	1.10	0.27	0.00	pounds of insurance/pounds of consumption	
sknndc80	0.001	0.00	3.16	0.00	0.00	pounds of insurance/pounds of consumption	
sknurb	8.462	3.54	2.39	0.02	8.46	pounds/year	
sknurb80	-2.971	4.40	-0.68	0.50	-2.97	pounds/year	

			P-Value
Joint F-test for year-dummies:	*chi2(25)*	2089.11	0
Joint F-test for cohort-dummies:	*chi2(10)*	1226.04	0
Joint F-test for instruments:	*chi2(126)*	164.67	0.0118

TABLE 3, Page 1: Probit for the Occupational-Risk-Proxy Selection Equation of Buying a Car and thus a Positive Amount of Insurance

Dependent Variable: Car Ownership <=> Positive Insurance Demand

Regressor	*Coefficient*	*Std. Error*	*T-stat.*	*P-Value*
c5y2d70	0.01	0.10	0.13	0.90
c5y2d71	0.06	0.10	0.65	0.52
c5y2d72	-0.11	0.10	-1.05	0.29
c5y2d73	0.12	0.10	1.17	0.24
c5y2d74	-0.06	0.19	-0.33	0.74
c5y2d75	-0.15	0.18	-0.81	0.42
c5y2d76	-0.18	0.18	-1.00	0.32
c5y2d77	-0.05	0.10	-0.50	0.62
c5y2d78	0.07	0.10	0.70	0.48
c5y3d70	0.01	0.11	0.12	0.91
c5y3d71	0.00	0.10	0.04	0.97
c5y3d72	-0.02	0.10	-0.15	0.88
c5y3d73	-0.06	0.10	-0.55	0.58
c5y3d74	-0.08	0.19	-0.41	0.69
c5y3d75	-0.16	0.18	-0.89	0.37
c5y3d76	-0.25	0.18	-1.38	0.17
c5y3d77	0.02	0.10	0.16	0.87
c5y3d78	0.09	0.11	0.86	0.39
c5y3d79	-0.16	0.18	-0.91	0.36
c5y3d80	-0.31	0.17	-1.85	0.06
c5y3d81	-0.05	0.10	-0.48	0.63
c5y3d82	-0.38	0.18	-2.08	0.04
c5y4d70	-0.03	0.11	-0.24	0.81
c5y4d71	0.04	0.10	0.43	0.67
c5y4d72	-0.24	0.10	-2.30	0.02
c5y4d73	-0.16	0.10	-1.58	0.11
c5y4d74	-0.04	0.19	-0.20	0.84
c5y4d75	-0.20	0.18	-1.08	0.28
c5y4d76	-0.20	0.18	-1.10	0.27
c5y4d79	-0.25	0.18	-1.36	0.17
c5y4d80	-0.26	0.17	-1.60	0.11
c5y4d82	-0.30	0.18	-1.66	0.10
c5y4d83	0.01	0.12	0.06	0.96
c5y4d84	-0.08	0.11	-0.76	0.45
c5y4d85	0.07	0.14	0.49	0.62
c5y4d86	-0.01	0.14	-0.10	0.92
c5y4d87	-0.11	0.13	-0.82	0.41
c5y5d70	-0.06	0.10	-0.54	0.59
c5y5d71	-0.03	0.10	-0.34	0.74
c5y5d72	-0.14	0.10	-1.39	0.16
c5y5d73	0.00	0.10	-0.04	0.97
c5y5d74	-0.22	0.19	-1.14	0.26
c5y5d75	-0.24	0.19	-1.28	0.20
c5y5d76	-0.17	0.18	-0.94	0.35
c5y5d77	-0.02	0.10	-0.20	0.85
c5y5d78	0.07	0.10	0.65	0.52
c5y5d79	-0.20	0.18	-1.13	0.26
c5y5d80	-0.25	0.17	-1.51	0.13
c5y5d81	0.07	0.10	0.72	0.47
c5y5d82	-0.26	0.18	-1.47	0.14
c5y5d83	0.02	0.11	0.16	0.88
c5y5d84	-0.09	0.11	-0.87	0.39
c5y5d85	0.17	0.14	1.23	0.22

Regressor	*Coefficient*	*Std. Error*	*T-stat.*	*P-Value*
c5y5d86	-0.06	0.13	-0.46	0.65
c5y5d87	-0.18	0.13	-1.40	0.16
c5y5d88	0.15	0.11	1.32	0.19
c5y5d89	-0.16	0.13	-1.21	0.23
c5y5d92	-0.14	0.14	-0.98	0.33
c5y5d93	-0.25	0.15	-1.66	0.10
c5y6d70	-0.05	0.10	-0.46	0.65
c5y6d71	-0.08	0.10	-0.79	0.43
c5y6d72	-0.08	0.10	-0.85	0.40
c5y6d73	-0.16	0.10	-1.65	0.10
c5y6d74	-0.16	0.19	-0.86	0.39
c5y6d75	-0.25	0.19	-1.33	0.18
c5y6d76	-0.28	0.18	-1.54	0.12
c5y6d77	-0.02	0.10	-0.21	0.83
c5y6d78	0.01	0.10	0.14	0.89
c5y6d79	-0.21	0.18	-1.17	0.24
c5y6d80	-0.27	0.17	-1.62	0.11
c5y6d81	0.03	0.10	0.34	0.73
c5y6d82	-0.21	0.18	-1.20	0.23
c5y6d83	-0.01	0.11	-0.12	0.90
c5y6d85	0.18	0.11	1.63	0.10
c5y6d86	0.01	0.11	0.10	0.92
c5y6d87	-0.21	0.10	-2.08	0.04
c5y6d88	0.12	0.11	1.13	0.26
c5y6d89	-0.16	0.10	-1.55	0.12
c5y6d90	-0.16	0.10	-1.53	0.13
c5y6d91	-0.14	0.11	-1.20	0.23
c5y6d92	-0.22	0.12	-1.82	0.07
c5y6d93	-0.28	0.13	-2.25	0.03
c5y6d94	-0.21	0.13	-1.63	0.10
c5y6d95	-0.16	0.14	-1.18	0.24
c5y7d77	0.13	0.18	0.74	0.46
c5y7d78	0.24	0.17	1.39	0.17
c5y7d79	0.02	0.09	0.20	0.84
c5y7d81	0.23	0.17	1.32	0.19
c5y7d82	-0.06	0.09	-0.69	0.49
c5y7d83	0.27	0.18	1.47	0.14
c5y7d84	0.21	0.18	1.16	0.25
c5y7d85	0.32	0.20	1.60	0.11
c5y7d86	0.38	0.20	1.93	0.05
c5y7d87	0.15	0.20	0.76	0.45
c5y7d88	0.41	0.18	2.23	0.03
c5y7d89	0.13	0.20	0.66	0.51
c5y7d90	0.14	0.18	0.78	0.43
c5y7d91	0.24	0.18	1.33	0.18
c5y7d92	0.06	0.21	0.27	0.79
c5y7d93	0.06	0.21	0.27	0.79
c5y7d94	0.11	0.21	0.52	0.60
c5y7d95	0.14	0.22	0.66	0.51
c5y8d81	0.32	0.18	1.79	0.07
c5y8d83	0.38	0.18	2.03	0.04
c5y8d84	0.31	0.18	1.71	0.09
c5y8d85	0.47	0.20	2.35	0.02

TABLE 3, Page 2: Probit for the Occupational-Risk-Proxy Selection Equation of Buying a Car and thus a Positive Amount of Insurance

Regressor	*Coefficient*	*Std. Error*	*T-stat.*	*P-Value*
c5y8d86	0.43	0.20	2.15	0.03
c5y8d87	0.25	0.20	1.28	0.20
c5y8d88	0.50	0.18	2.77	0.01
c5y8d89	0.17	0.20	0.89	0.37
c5y8d90	0.35	0.18	1.93	0.05
c5y8d91	0.30	0.18	1.65	0.10
c5y8d92	0.24	0.20	1.19	0.24
c5y8d93	0.23	0.21	1.10	0.27
c5y8d94	0.24	0.21	1.16	0.25
c5y8d95	0.23	0.22	1.08	0.28
c5y9d88	0.24	0.14	1.76	0.08
c5y9d90	-0.09	0.13	-0.69	0.49
c5y9d91	0.03	0.14	0.20	0.84
c5y9d92	-0.06	0.08	-0.68	0.50
c5y9d93	-0.04	0.09	-0.46	0.65
c5y9d94	-0.03	0.09	-0.29	0.77
c5y9d95	0.02	0.10	0.21	0.83
c5y10d90	-0.05	0.15	-0.32	0.75
c5y10d91	0.01	0.15	0.10	0.92
c5y10d95	0.11	0.08	1.29	0.20
valcar	0.00	0.00	38.89	0.00
valcar80	0.00	0.00	-8.34	0.00
valcar2	0.00	0.00	-19.59	0.00
valca280	0.00	0.00	9.01	0.00
married	-0.31	0.04	-7.74	0.00
marrd80	-0.08	0.05	-1.77	0.08
sex	-0.13	0.04	-2.94	0.00
sex80	-0.20	0.05	-3.95	0.00
adults	0.22	0.02	12.26	0.00
adults80	0.14	0.02	6.25	0.00
lnndcW	0.05	0.02	2.71	0.01
lnndcW80	0.06	0.02	2.95	0.00
urban1	0.04	0.02	1.91	0.06
urban80	-0.02	0.03	-0.69	0.49
unskman	-0.09	0.18	-0.52	0.60
unsndcW	0.00	0.00	-0.21	0.83
unsmar	0.03	0.13	0.20	0.84
unssex	-0.25	0.18	-1.40	0.16
unvcar	0.00	0.00	2.66	0.01
unvcar2	0.00	0.00	-2.23	0.03
unsad	-0.01	0.06	-0.21	0.83
unsurb	0.01	0.08	0.15	0.88
unsk80	-0.05	0.23	-0.23	0.82
unsvca80	0.00	0.00	-1.13	0.26
unvc802	0.00	0.00	1.07	0.28
unsma80	0.20	0.17	1.16	0.25
unsse80	0.39	0.22	1.79	0.07
unsad80	-0.03	0.08	-0.35	0.73
unsndc80	0.00	0.00	-0.12	0.90
unsurb80	0.04	0.12	0.35	0.73
sknman	0.21	0.10	2.05	0.04
sknndcW	0.00	0.00	0.41	0.68
sknmar	-0.36	0.09	-4.11	0.00
sknsex	-0.32	0.11	-3.01	0.00
skvcar	0.00	0.00	-4.14	0.00

Regressor	*Coefficient*	*Std. Error*	*T-stat.*	*P-Value*
skvcar2	0.00	0.00	5.27	0.00
sknad	-0.08	0.04	-1.77	0.08
sknurb	-0.02	0.05	-0.36	0.72
skn80	-0.22	0.12	-1.78	0.08
sknvca80	0.00	0.00	0.40	0.69
skvc802	0.00	0.00	-2.43	0.02
sknma80	0.07	0.10	0.73	0.47
sknse80	0.42	0.12	3.51	0.00
sknad80	0.11	0.05	2.12	0.03
sknndc80	0.00	0.00	2.73	0.01
sknurb80	0.07	0.06	1.09	0.28
coh5y2	0.04	0.08	0.48	0.63
coh5y3	0.13	0.08	1.64	0.10
coh5y4	0.17	0.08	2.18	0.03
coh5y5	0.23	0.08	2.97	0.00
coh5y6	0.32	0.08	4.22	0.00
coh5y7	0.08	0.17	0.48	0.63
coh5y8	0.03	0.17	0.17	0.87
coh5y9	0.43	0.11	3.80	0.00
coh5y10	0.56	0.13	4.38	0.00
coh5y11	0.53	0.15	3.57	0.00
d70	0.03	0.08	0.45	0.65
d71	0.02	0.07	0.34	0.74
d72	0.15	0.07	2.01	0.04
d73	0.13	0.07	1.81	0.07
d74	0.24	0.17	1.37	0.17
d75	0.35	0.17	2.04	0.04
d76	0.26	0.16	1.61	0.11
d77	0.25	0.08	3.24	0.00
d78	0.17	0.08	2.19	0.03
d79	0.46	0.17	2.71	0.01
d81	-0.27	0.17	-1.62	0.10
d82	-0.52	0.07	-7.85	0.00
d83	-0.90	0.17	-5.22	0.00
d84	-0.90	0.17	-5.26	0.00
d85	-1.02	0.19	-5.34	0.00
d86	-0.88	0.19	-4.61	0.00
d87	-0.59	0.19	-3.13	0.00
d88	-0.76	0.17	-4.41	0.00
d89	-0.39	0.19	-2.08	0.04
d90	-0.45	0.17	-2.67	0.01
d91	-0.43	0.17	-2.49	0.01
d92	-0.40	0.20	-2.07	0.04
d93	-0.44	0.20	-2.22	0.03
d94	-0.54	0.20	-2.77	0.01
d95	-0.60	0.21	-2.92	0.00
_cons	-1.81	0.16	-11.63	0.00

Test for independence of equations:

chi2(1)	4464.11
P-Value	0

TABLE 4: Changes in Insurance Demand per Changes in the Coefficient of Variation and their Macro Relevance

	69-95	***69-79***	***80-95***
Coefficient of variation of household income (CVINC) of unskilled manual workers:	0.044	0.036	0.050
Coefficient of variation of household income (CVINC) of skilled non-manual workers:	0.032	0.030	0.034

	69-95	***69-79***	***80-95***
Unskilled Manual vs. Skilled Non-Manual: Diff. Ins per carvalue/ Diff. CV(Inc.) :	19.42	29.69	8.92
Macro Effect: Micro-effect weighted by population proportion of unskilled manual:	0.49	0.94	0.07
Macro Effect: Micro-effect weighted by population proportion of skilled non-manual:	5.57	7.00	3.33

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