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Housing Wealth, Liquidity Constraints and Self-Employment

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by

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Abstract

This paper investigates the existence of liquidity constraints facing entrepreneurs in the United Kingdom. Using a household-level panel data set, entry to self-employment is shown to be a function of household net worth. We use inheritances and unanticipated movements in house prices as instruments for shocks to liquidity. Results indicate that inheritances are a poor instrument for liquidity constraints because both past *and future* inheritances predict entry to self-employment. House prices shocks are a more plausible instrument because self-employed households disproportionately re-mortgage, but our results again indicate little evidence of house price shocks unbinding liquidity constraints facing the would-be self-employed.

Key words: Self-employment liquidity windfalls

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Housing Wealth, Liquidity Constraints and Self-Employment

1. Introduction

This paper examines the impact of movements in household wealth on entrepreneurial activity undertaken by households in the United Kingdom (UK), using a UK household panel data set. This is not a wholly new field and, in common with several other studies, we find evidence that household financial wealth is positively related to subsequent entry to self-employment. Several papers have argued that this finding provides evidence for the hypothesis that some households face liquidity constraints when seeking to undertake entrepreneurial activities. However, caution must be exercised in interpreting this relationship: various selection mechanisms, for example household human capital attributes or unobserved abilities (such as financial acumen), may generate an underlying association between financial wealth and a propensity to self-employment without liquidity constraints playing a part.

A standard response to this problem of interpretation measures positive 'shocks' to household financial wealth as a potential instrument for the unravelling of liquidity constraints facing would-be self-employed households. Depending on the particular study, different indicators of 'shocks' have been used: inheritances, redundancy payments, lottery wins and changes in self-reported housing wealth are all examples. An obvious problem with some of these indicators is that they measure events that are not truly exogenous to the decision to become self-employed: for example, receipt of redundancy payments may arise from a conscious decision to leave paid employment in order to enter self-employment. Other indicators can be reasonably treated as having some degree of exogeneity (e.g. the exact timing of receipt of an inheritance, or local house price changes) and this provides a test, exploited by Hurst and Lusardi (2004), of whether the *timing* of such events is associated with subsequent self-employment decisions. Timing matters, as those authors argue, because of the likely association of such events with the household's level of wealth in general. In any event, both levels of wealth *and* (instrumented) shocks to wealth should be included in an explanatory model.

In our paper, we test or retest several of these ideas in the UK context. The panel data set that we use has been exploited before (e.g. Taylor, 2001) but we now have more waves of data with the appropriate variables, so allowing us to test a much

richer set of hypotheses. We find that levels of household wealth and business start-ups are indeed positively correlated, but as explained previously, this finding does not necessarily indicate the presence of liquidity constraints. We therefore augment the model with the standard instruments for wealth 'windfalls', including receipt of inheritances and 'shocks' to local house prices – the latter calculated at a more disaggregated level than the usual regional measure adopted by several other studies.

Several studies have examined the role of inheritances in the UK context and shown significant positive effects on business start-ups but, in common with Hurst and Lusardi (2004) for the US, we cast doubt on the interpretation of this result as evidence of liquidity constraints by examining the *timing* of the inheritance relative to business start-up. However, in contrast to those authors, perhaps because of the finer disaggregation of our instrument and its different construction, we do find some evidence that shocks to local (i.e. county-level) house prices *are* a predictor of a spell of self-employment.

From this last finding, we should find a relationship between re-mortgaging behaviour, business start-ups and house price shocks. So we then examine the relationship between re-mortgaging activity and self-employment, and also between house price 'shocks' and re-mortgaging. We find evidence that self-employed start-ups disproportionately use re-mortgaging as a financing strategy, but that the probability of remortgaging in response to house price shocks is not significantly different between self-employed starters and other households, conditioned on the determinants of becoming self-employed. Our results therefore suggest that local house price shocks, suitably measured, may be the best predictor of small business start-ups from among the several indicators of household financial wealth, but no clear evidence that house price shocks unbind liquidity constraints that deter business start-ups.

2. Background and previous literature

The prevalence of financial constraints facing would-be entrepreneurs is an important issue for government policies directed towards business creation. There are an estimated 3.2 million sole proprietors in the UK, accounting for 12% of employed workers[1]. Publicly funded schemes established in the UK provide assistance for

[1] Small Business Service (2006), Small and Medium Sized Enterprise (SME) Statistics 2007.

workers entering self-employment through loan guarantees and grants for research and development.[2] Moreover, specific schemes are aimed at entrepreneurs from deprived areas who are less likely to be able to access financial capital from banks or within the household.[3]

Previous studies have presented evidence consistent with the existence of financial constraints, as proxied by household wealth, facing the would-be self-employed (see, for examples studies on US data by Evans and Jovanovic, 1989; Evans and Leighton, 1989 and Meyer, 1990, and of the UK by Black *et al*, 1996).[4] However caution must be exercised in interpreting lower levels of household financial wealth as a barrier to entry into self-employment. The more recent empirical literature on financial constraints and self-employment has drawn on models in which workers engage in asset-accumulation strategies prior to entering self-employment (as in, for example Buera, 2003; Astebro and Bernhardt, 2005; Cagetti and Di Nardi, 2006). Hence, the observation that self-employed households exhibit greater financial assets prior to undertaking self-employment may not necessarily be indicative of financial constraints *per se* but rather of the joint determination of financial wealth and firm capital given human capital (Xu, 1998; Astebro and Bernhardt, 2005).

Empirical studies have attempted to resolve this potential endogeneity problem by estimating the impact of financial *windfalls* on the probability of becoming and remaining self-employed (as in Holtz-Eakin, 1994; Blanchflower and Oswald, 1998; Lindh and Ohlsson, 1996; Taylor 2001, and Hurst and Lusardi, 2004; and, for the UK, Taylor, 2001 and Henley, 2005a, 2005b). The argument for using financial windfalls is that they represent exogenous movements in household wealth which relax capital constraints arising due to households' inability of borrow. If households that receive a financial windfall can be shown to be more likely to enter self-employment than

[2] As examples of each: The Small Firms Loan Guarantee Scheme, established in 2005, underwrites 75% of the value of loans taken out by small and medium size enterprises in their first five years of trading. Grants for Research and Development up to a value of £20,000 provided by the Department for Business, Enterprise and Regulatory Reform include 'micro grants' targeted to businesses with fewer than 10 employees.

[3] As examples: New Entrepreneur Scholarships, provided by the National Federation of Enterprise Agencies (NFEA) funded by the Learning and Skills Council (LSC), are targeted to households in bottom 25% Super Output Areas (SOAs). Government funded 'Community Finance Development Associations' also operate in these areas to provide loans to business start-ups that are unable to gain loans from banks or raise internal finance. These schemes have provided over £110m of grants and loans to small enterprises since 2004.

[4] The literature on the economics of self-employment and entrepreneurship has been recently surveyed by Parker (2004).

households not receiving such a windfall, then access to finance appears to be a limiting factor in self-employment entry. On the other hand, if there is no evidence that financial windfalls impact on self-employment entry, there is little evidence that would-be self-employment workers are undercapitalised and require financial windfalls in order to finance their entrepreneurial activities.

However, the well-cited study by Hurst and Lusardi (2004) has questioned whether there is *any* evidence for liquidity constraints facing entrepreneurs. Using data from the Panel Study of Income Dynamics (PSID), their results indicate at most a weak relationship between household wealth and subsequent self-employment entry. They question the use of inheritances as examples of 'windfall gains' providing liquidity to households. Instead they suggest using movements in housing wealth as an alternative instrument for household liquidity, but find no statistically significant relationship between unexplained variations in regional house price movements and the propensity to start a business.

The present paper uses a British household panel survey to replicate some of Hurst and Lusardi's tests on UK data. In contrast to those authors, we use a much more disaggregated measure of unexplained house price movements, and we do find some evidence of a relationship between 'shocks' to house value and subsequent entry into self-employment. However, in support of those authors, and in contrast to some other studies for the UK, we find no evidence that other types of 'windfalls' are associated with entry into self-employment.

This finding on the importance of housing wealth should not be too surprising. Housing wealth potentially provides a rich source of finance to the would-be self-employed seeking to fund lumpy start-up costs such as purchasing machinery, hiring premises or accruing inventories (Black *et. al.,* 1996). Housing acts as collateral against which households can borrow on cheaper terms than uncollateralized borrowing such as business loans, personal loans or other forms of consumer credit. The majority of home-owning households of working age are experienced in mortgage refinancing and can access mortgage markets cheaply and on favourable repayment terms. The increasing prevalence of self-certification mortgages in both the US and UK indicates the ease with which households undertaking changes in labour market status can continue to access mortgage finance. Moreover, home-owning households have experienced considerable appreciation in the value of

housing over the last decade suggesting for many households housing wealth might provide ample entrepreneurial finance. Henley (2005a) indeed finds that the *level* of household housing wealth is positively related to entry to self-employment.

3. Empirical Issues

3.1. Measurement of 'windfalls'

Financial windfalls typically used include receipts from lottery winnings, inheritances, redundancy payments, bonus payments and personal accident claims. Such windfalls, it is argued, reduce the capital constraint faced by a household and are exogenous to an asset accumulation strategy. Studies on UK data employing a variety of 'windfall' occurrences tend to show strong coefficients on inheritances and lottery winnings, providing evidence consistent with the financial constraints hypothesis (Taylor, 2001; Blanchflower and Oswald, 1998). Lindh and Olsson (1996) provide evidence on the impact of lottery wins on self-employment from Sweden.

However, the various measures of 'windfalls' differ in their plausibility. Some such financial accruals may be anticipated by households and should not be treated as wholly exogenous. Bonus payments and redundancy payments may be endogenous to household labour market activity. Workers may choose to take voluntary redundancy and use exit benefits as part of an asset accumulation strategy undertaken prior to entering self-employment. Bonuses may be earned, in part, with the motivation of raising the necessary capital to exit paid employment.[5] The reverse story is, of course, that redundancy is entirely involuntary and that compensatory payments in times of recession thereby induce 'forced' transitions into self-employment.

The same argument concerning potential endogeneity also applies (to a lesser extent) to other financial 'windfalls' often utilised in the literature. Whilst lottery winnings and inheritances might be classified as exogenous windfalls, they are not necessarily unanticipated. Moreover, if self-employment is more 'risky' (in terms of economic outcomes) then individuals with a lower degree of risk aversion may take part both in self-employment *and* lotteries. In addition, the timing and value of inheritances might be predictable from the age and health of benefactors and their holdings of financial assets (about which potential benefactors such as spouses and

[5] Taylor (2001) indicates that households receiving bonus payments are actually *less* likely to enter self-employment.

children will most likely be aware).[6] If financial windfalls are actually measuring preferences or are potentially anticipated then a natural test of the 'liquidity constraints' model arises from the *timing* of 'windfalls': if such windfalls are genuinely unbinding liquidity constraints, then windfalls should 'predict' self-employment start-ups, whereas windfalls occurring after start-up should have no effect. This can easily be tested given the panel nature of our data.

The use of movements in house prices as financial 'windfalls' also presents potential endogeneity and predictability problems. Households may anticipate housing gains as a vehicle for accumulating financial wealth prior to entering self-employment through re-mortgaging. Self-reported housing wealth gains are themselves potentially endogeneous – for example in part determined by moving house or by home improvement activity (which may in turn both be related to changing economic status); however such activities are themselves costly.[7] Instead, the more relevant issue will be the predictability of returns to existing housing assets. Households anticipating house price growth may substitute active financial saving for passive housing gains if mortgage markets allow the extraction of housing equity to fund self-employment activity.

In summary, simple values of inheritances, lottery winnings and changes in housing wealth received may not be appropriate instruments *per se* for endogenously determined household financial assets if the instruments themselves are endogenous to any household activity that is correlated with the decision to enter self-employment, and to predictable components of the household asset accumulation strategy. Instrumental variable estimates based on such variables may therefore still overestimate the impact of windfalls on relaxing capital constraints.

A second methodological issue, hinted at in our discussion of lottery participation, is the general identification of the propensity to become self-employment as an increasing function of wealth. Microeconomic studies typically

[6] For example, Inheritance Tax legislation in the UK permits households to make tax-free transfers of financial resources to beneficiaries before death. However, transfers of a significant size are only tax exempt if the benefactor survives more than seven years after the transfer is made. The timing of household decisions to bring-forward bequests might, therefore, reveal the household survival expectations.

[7] A householder intending to start-up a business may build an extension for an office or a workshop – this may involve re-mortgaging and/or a simultaneous change in the value of the house. Alternatively the household may move nearer to a potential market. However neither of these events, if associated with changes in house value, can be treated as a costless 'windfall' to household wealth.

estimate probit models for self-employment entry from a sample of employed and currently working households. Household net financial assets at time *t* are then used to predict entry to self-employment between *t* and *t+1*. This approach implicitly models self-employment as an increasing function of wealth. Whilst liquidity constraints and start-up costs would imply self-employment entry is contingent upon an available level of financial resources, desire to enter self-employment is also a function of household characteristics (such as family work history, preference for work independence, entrepreneurial instinct) and recent labour market experiences (such as satisfaction with existing employment). These points have been noted, and an improved identification strategy might be to model the decision to *prefer* self-employment simultaneously with *entry* to self-employment. However, in common with Henley (2005b), we find no evidence in our data that windfalls are more likely to induce self-employment among individuals who have previously expressed a preference for self-employment; indeed the association between subsequent self-employment and previously expressed preferences for, or expectations of, self-employment is remarkably limited in the data.

3.2. The data

The data used in this study is the British Household Panel Survey (BHPS), also utilised for a previous study of windfall gains and self-employment entry by Taylor (2001). The BHPS is a nationally representative survey of UK households which has tracked adult members of participant households since 1991. The survey includes a household-level questionnaire (including questions on housing) and an individual questionnaire for each adult member of the household. BHPS respondents are questioned in detail in each wave on their labour market activity. As well as labour market status, respondents are questioned about the timings of transitions and reasons for job transfer or labour market entry and exit. The survey also questions respondents on the size of their income and benefit receipts. Additional detailed data on lifetime employment history is included in Wave 3 of the survey (1993). In addition to responses on labour market status, including self-employment, the BHPS dataset also includes records of the number of employees employed by small business owners, income arising from self-employment and the relevant industrial classification.

Data on financial assets and debt is collected at five-year intervals starting from 1995 – we are able to utilise three waves with such data. Values of 'windfall income' have been collected in each year since 1997. These include bonus payments, life insurance payouts, pension lump-sum payouts, accident claims, redundancy payments, inheritances and windfalls arising from building society conversion to listed banks. Respondents are asked whether they received a financial windfall. If they received a windfall they are further asked about the size of the payment.

An earlier module on windfall gains included in the 1995 wave questioned respondents on the types of windfalls received but recorded only the total value of windfalls rather than the value by each type of windfall (this wave of data is the only wave utilised by Taylor, 2001). Thus, for that wave we are limited to the (somewhat unsatisfactory) strategy of using indicator variables for whether a certain type of windfall was received or not, or of an aggregate value which incorporates some sources of income that are disputable 'windfalls'. In contrast, we can also use data that differentiates values for each type of 'windfall', allowing a cleaner experiment. In addition, in one wave (1997), respondents are asked how they made use of their windfalls. However, 91% of respondents reporting a windfall chose not to answer this question, hence no 'direct' evidence for windfalls being used to fund self-employment is available from the dataset.

4. Self-Employment Entry and Household Wealth

We now examine the relation between household transitions into self-employment and household financial wealth. A positive relationship between household wealth and self-employment entry could be interpreted either as that households require capital in order to finance entrepreneurial projects, or that there is a positive association between preferences for entrepreneurship and household wealth. If, however, the would-be self-employed face no constraints to funding entrepreneurial projects arising from either from a lack of financial constraints or negligible size of start-up costs, then there is no reason to expect a positive relationship.

As mentioned, detailed information on household wealth is available in three waves of the BHPS dataset: 1995, 2000 and 2005. Since we are focussing on behaviour both before and *after* we observe (changes) in financial wealth, and 2005 is

the last wave of data currently available (as of late-2007) we mostly limit the analysis to the waves between 1992 and 2003. The sample size is limited by missing observations in the assets and debt modules, particularly for household financial assets and unsecured debts. Household liquid financial assets, for convenience henceforth denoted 'net worth', are calculated for non-business owning households in both waves. Net worth is defined as self-reported financial wealth plus self-reported house value minus our calculation of secured debt based on the mortgage terms (which are reported) and minus self-reported unsecured debt. (For further details on these calculations, see Disney, Bridges and Gathergood, 2007). Financial wealth is the sum of savings accounts, stock holdings, national savings bonds, national savings certificates, premium bonds and TESSA/PEP/ISA[8] accounts; unsecured debts are the sum of credit card balances (including store cards), outstanding personal loans, bank account overdrafts, the value of hire purchase agreements and the value of catalogue and mail order purchase agreements; house value is in this case the self-reported value of first and additional homes owned by household members; secured debt is the sum of self-reported outstanding loans on all properties owned by the household. The measure of net worth utilised here excludes accrued pension rights, which both are illiquid and cannot be utilised as collateral, and so cannot be used to fund self-employment.

As is apparent from the summary statistics provided in Table 1, households in the pooled sample for which we observe financial assets and who subsequently enter self-employment over the course of the following year (i.e. between 1995 and 1996 or 2000 and 2001) hold significantly higher levels of net financial wealth than the sample as a whole. The sample includes all households with household heads over 18 years or age and below 65 years of age who were in paid employment in 1995 or 2000. Of the 198 households in which the head of household or spouse entered self-employment between 1995 and 1996 or 2000 and 2001, household net worth was on average approximately £103,000, compared to £61,000 for those household remaining outside self-employment. Households entering self-employment are less likely to

[8] Personal Equity Plans (PEPs), Tax Exempt Special Savings Accounts (TESSAs) and Individual Savings Accounts (ISAs) are all untaxed personal savings accounts allowing holders to avoid income tax on investment returns, initially introduced to encourage equity investments but later extended to unit / investment trusts and corporate bonds as well as cash deposits. TESSAs and PEPs were available for investment between 1987 and 1999 when they were replaced by less-generous ISAs with a lower limit on the value of tax-free investments.

come from an ethnic minority, less likely to have a female head of household and are more likely to be homeowners. It is noticeable that households entering self-employment have higher household labour income over the previous five years, suggesting the probability of becoming self-employed is most likely correlated with household human capital. Significantly, those entering self-employment are over three times as likely to have experienced a spell of self-employment in the previous five years. Nearly 40% of those entering self-employment had left a spell of self-employment during the five years beforehand. By contrast, the educational background of the two groups appears to differ little.

Table 2 reports probit estimates of the effect of household liquid financial assets on the probability of self-employment entry among non-self-employed households in 1995 / 2000, with the dependent variable taking a value of 1 if the head of household or spouse entered self-employment in 1996 or 2001 and a value of 0 otherwise. Control variables, using 1995 and 2000 observations, include age, education and family composition as well as household labour income and a dummy variable for whether the household had experienced a spell of self-employment for at least one year within the previous five-year period. Marginal effects are calculated at variable means.

Column 1 reports estimates from the baseline specification. The coefficient on household net worth is positive and significant at the 1% level. The probability of entering self-employment decreases with age, but increases with recent experience of self-employment. Evaluating marginal effects at variable means reveals that the marginal effect on the propensity to enter self-employment of increasing net worth by £100,000 is 0.003. Against the base probability of becoming self-employed of 1.1%, the effect of increasing net worth by this amount is to increase the propensity to become self-employed to 1.4%, an increase of 27 per cent. This result is slightly larger than the 20 per cent impact (the impact of a $200,000 increase in net worth, assuming £1 ≅ $2, found by Hurst and Lusardi, 2004), although the impact is small given the magnitude of the change in net worth considered. Column 2 further follows Hurst and Lusardi by exploring non-linearities in the relationship between household net worth and entry to self-employment, through including a fifth-order polynomial in net worth in the regression. Using a non-linear specification in net worth improves the fit of the model up to the fifth-order polynomial. The net worth variables in the

non-linear specification are jointly significant at the 5% level. This indicates that the probability of entering self-employment varies over the wealth distribution.

Initial evidence therefore indicates a weak relationship between financial wealth and the propensity to start a business, and very similar results to those found in the US literature. Nor is the relationship between household wealth and self-employment start-up linear: a non-linear specification in net worth improves the start-up decision relative to a linear model.

5. Instrumental Variable Estimates

5.1 Inheritances

This section re-estimates the relationship between household wealth and self-employment start-up employing instrumental variables for household wealth using 'financial windfalls' – exogenous changes in wealth uncorrelated, it is assumed, with household asset accumulation or human capital. Following previous work on the BHPS by Taylor (2001) we initially explore the role of inheritances as an instrument for financial wealth. Evidence in Taylor (2001) suggests that receipt of redundancy payments and inheritances are both positively related to self-employment entry (although in the latter case the coefficient is not statistically significantly different from zero in his published results). In contrast, evidence of a positive and statistically significant relationship is obtained by Blanchflower and Oswald (1998) using UK data and for US data in Holtz-Eakin *et al* (1994). A *negative* and statistically significant relationship is found for households in receipt of bonus payments by Taylor, and an insignificant coefficient for lottery winnings. We choose not to employ bonuses or redundancy payments as financial 'windfalls', for reasons discussed in Section 2. We also subsequently consider movements in housing wealth (not used in Taylor, 2001) as an alternative instrument for financial windfalls.

The BHPS has included detailed questions on the values on inheritances received since 1997, having previously surveyed respondents in 1995 on the types of windfalls received and the total value of all windfalls (Taylor, 2001). Since 1997, respondents have been questioned each year on the types of windfalls received and the value of each windfall type received. Restricting the analysis to the 2000/2001 waves, and utilising the total value of inheritances received by the household over the previous three years as an instrument for household net worth, then, of the 4,469

households in the later sample, 314 had received an inheritance within the previous 3 years with an average value of inheritance received among these households of approximately £19,000.

We first regress household net worth against the value of inheritances received as well as the additional control variables utilised in Table 2. The coefficient on inheritance of 0.45 (standard error 0.19, F-statistic for inclusion of inheritance variable 9.16) implies that household net worth increases by £0.45 for each one pound on inheritance received over the previous 3 years.

Table 3 reports instrumental variable (IV) estimates for transition to self-employment between 2000 and 2001 using inheritance received in the last 3 years as an instrument for net worth, with additional control variables as in Table 2. In general Column 1 reveals that the IV estimates do not explain the start-up decision as well as the earlier estimates in Table 2. Estimates indicate a positive relationship between self-employment entry and head of household ethnic background, as well as a strong relationship between previous self-employment and the current transition to self-employment. The same pattern of results is found as those in Table 2, though coefficients are for the greater part weaker and less statistically significant in the IV estimates. Nevertheless, the coefficient on instrumented net worth is not only positive but significant at the 5% level – a stronger result than Taylor (2001), probably reflecting the fact that we can identify the value of the inheritance rather than simply whether one was received. The coefficient is also slightly larger than that for net worth in Table 2, suggesting that inheritances may be a better instrument for liquidity.

However, despite this positive relationship between instrumented net worth and transition to self-employment, inheritances may not be operating by unbinding a liquidity constraint. In Column 2 *future* inheritances are used as an instrument for current net worth. This repeats the strategy adopted by Hurst and Lusardi (2004). Future inheritances are defined as the sum of inheritances received by households between the years 2000 and 2003. The summary statistics for future inheritances reveal a pattern similar to that for past inheritances, with the average inheritance received by households rising to £24,000 among the 271 households reporting receiving an inheritance during the period. The coefficient on net worth instrumented by future inheritances in Column 2 is positive and statistically significant at the 1%

level. Moreover, it is very similar in magnitude to the coefficient on net worth instrumented by past inheritances in Column 1.

This result of future inheritances calls into question the view that inheritances impact on household liquidity *per se*. Noting the correlation in our data between household wealth and receipt of an inheritance then, as Hurst and Lusardi (2004) also argue given their identical result using PSID data, inheritances likely proxy for long run differences in household wealth or for the underlying propensity to become self-employed. They cite evidence for the strong intergenerational correlation in occupation, education, wealth and saving preferences documented by Altonji and Dunn (2000) and Charles and Hurst (2005).[9] As argued in Section 1, households most likely anticipate receiving an inheritance with some indication of value, even though the timing of receipt may be uncertain. The decision to enter self-employment on the part of households might be taken in anticipation of the receipt of an inheritance (which might fund capital investments or other expenditures) but, since it is hard to see a future inheritance being treated as collateral by a bank or lending agency, the story of inheritance unbinding liquidity constraints suggested by Taylor (2001) and others in the UK context does not stand up to scrutiny.

5.2 Movements in Housing Wealth

An alternative instrument for household wealth suggested in the literature is the changes in local-level house prices. As explained in Section 2, house price movements may relax liquidity constraints by providing household with greater collateral against which to secure mortgage finance. As self-reported house prices are endogenous to household home-improvement activity or reporting errors, a natural strategy is to use movements in a local-level house price index as an instrument for self-reported changes. Using local-level absolute house price changes as an

[9] One possibility then is that we are simply capturing the correlation between absolute differences in inheritances and the absolute value of wealth rather than the disproportionate concentration of inheritances among a (presumably richer) segment of the population which underpins the intergenerational transmission 'story'. So we control for the correlation between the absolute value of inheritances received and the level of household wealth by conditioning the value of inheritance on household income. The regressions in Columns 1 and 2 of table 1 are re-estimated using the value of inheritances received divided by household income in 1999 as an instrument for net worth divided by household income in 1999. Results reveal the same pattern to those found in Table 1: both past *and future* inheritances, conditioned upon current income, predict self-employment start-up to the same magnitude and with similar statistical significance.

instrument for household net worth potentially invites the same criticisms as those levelled against the use of inheritances: i) wealthier households experience greater housing gains and ii) such gains are not unanticipated on the part of households. We address this potential problem by utilising the *unpredictable* component of local-level house price movements as an instrument for household net worth.

Variation in house price movements in the UK across households, regions and over time is marked. We calculate house price changes at the county level for all UK counties using the Halifax House Price Index.[10] The county-level changes are then imputed to BHPS households. This gives a much finer spatial disaggregation of the 'shocks' to house prices than Hurst and Lusardi's analysis for the United States, which uses regional-level data. This greater variance may be one reason why we find rather more significance to house price 'shocks' than that paper.[11] The distribution of house price changes across households (using the county level proxy) over the three-year periods leading up to 1995 and 2000 is recorded in Table 4. In the earlier period, 1992-1994 nearly all households experienced falls in real house prices, caused by nominal losses combined with above average inflation. The average loss exceeds £2,500. By contrast, in the three years leading up to 2000 the average house price change experienced by households in the same was an increase of £35,000, with in excess of one-third of households experiencing house price gains in excess of £50,000.

We initially use changes in county-level house prices as an instrument for liquidity. Movements in county level prices have strong predictive power for household net worth in our sample. Using both periods of the sample (data is available on house price movements leading up to 1995 and 2000, increasing the sample size) and regressing household net worth on the cumulated value of house price movements over the previous 3-years plus additional controls from Table 2 as before, the coefficient on the county-level house price is 0.81 (standard error, 0.04, F-statistic for the inclusion of house price variable 325). This estimate implies that

[10] The Halifax House Price Index is the longest running index for the UK drawing on the largest sample of households. The index tracks the price of a 'standardised' house over time, adjusting for monthly variation in the composition of house price sales.

[11] We have 65 counties whereas Hurst and Lusardi use only 7 regions. They also estimate regional effects off a regression on self-reported house values, which may themselves be endogenous to decisions concerning wealth accumulation and self-employment status (for example if business start-up involves extension or conversion of a property).

households save approximately 81% of their housing gains. The strength and statistical significance of this coefficient is not surprising: as documented, much of the movement in household net worth in caused by movements in house prices (especially in the latter period).

Column 3 of Table 3 presents instrumental variable estimates using a linear probability model. The instrumental variable regression employing changes in county level house prices explains entry to self-employment less well than the regressions in Columns 1 and 2 using past and future inheritances. As in those regressions, entry to self-employment is driven by ethnic minority background and recent experience of self-employment. The coefficient on household net worth instrumented by county level house price changes is positive and statistically significant at the 1% level. The magnitude of the coefficient is approximately one third larger than in the regressions using inheritances as the instrument for household net worth. Column 4 then uses *future* house price changes as the instrument for net worth, following the approach adopted for inheritances in Column 2. Here, again, we find that household wealth instrumented by future house price changes predict entry to self-employment to an almost identical magnitude to that attributable to past house price changes. We interpret this as indicative that, as with future inheritances, house price movements proxy for more than movements in household liquidity and more likely correlate with household wealth[12].

Estimates using simple changes in house prices as an instrument for financial wealth assume that any movement in house prices can be treated as a 'windfall'. As discussed, financial 'windfalls' are, by definition, unanticipated. In order to model the unanticipated or surprise movements in house prices we re-estimate the IV regression using residuals from an AR(2) process for the house price as the proxy for windfall changes in house prices. This is implemented by fitting an AR(2) model to the yearly county-level house price data, including fixed effects (at the county level)

[12] As with inheritances, we examine the argument that the relationship is driven by absolute house price changes being correlated with household wealth by conditioning house price changes and net worth on household income and separately using the proportionate change in house price as an instrument for household net worth rather than absolute changes. The pattern in results for past and future house price changes remains in both cases, though in the latter case the proportionate change in house price (calculated as the absolute change in the average county-level house price divided by the average county-level house price) is not significant as an instrument for household net worth at the 10% level.

and time dummies. The estimated residuals for each county in each year are used as the unpredictable component of the house price. Table 5 summarises the AR(2) estimates from the Halifax county level house price index between 1990 and 1999 (to allow for the calculation of cumulative shocks between 1992-1994 and 1997-1999). Over the period in question the 77% of the variation in house prices is explained by the autoregressive structure of the AR(2) model; the remainder is the residual we use in our estimation.

Column 5 of Table 3 utilises the cumulated residual components of the county-level house prices series as an instrument for net worth, using the pooled sample of 1995 and 2000 observations. Household net worth, instrumented by unanticipated house price movements, is positively related to subsequent entry to self-employment, but only weakly so at a lower level of statistical significance than the value of inheritances received or pure local house price changes - the coefficient on instrumented household net worth is now 0.02, statistically significant at the 10% level. This result indicates little role for unanticipated movements in housing prices as an instrument for household liquidity. For consistency, Column 6 of Table 3 then utilises future house price shocks as an instrument for household net worth. The cumulated residual components of the county-level house price series over the subsequent three years are uncorrelated with household net worth and results indicate no relationship between net worth instrumented by future house price shocks and entry to self-employment. This discrepancy between past and future unanticipated movements might be indicative of a financing constraint motive, except that the coefficients on past and future movements in Columns 5 and 6 are not significantly different from each other.

5.3 House Price Shocks, Mortgage Refinancing and Self-Employment

The results from the previous section lend some support to the argument that households entering self-employment utilise gains in housing wealth as a source of entrepreneurial finance. This suggests another test. As argued earlier, movements in housing wealth relax liquidity constraints facing households by increasing the value of collateral to the household against which it can borrow. This is true whether or not households wish to enter self-employment – for example, households may simply use the additional collateral to substitute secured for outstanding unsecured debt (as in Disney, Bridges and Gathergood, 2007). However, if house price shocks particularly

allow constrained households to fund entry to self-employment via this route, we might observe *different* effects of house price windfalls on the refinancing activity of households entering self-employment compared to the non self-employed.

Table 6 therefore provides summary statistics on mortgage refinancing rates across households who do and do not enter self-employment. Among households not entering self-employment the proportion of households refinancing appears constant at approximately 18% over the sample period. However, among those entering self-employment the pattern is somewhat different. Among this group of households we observe approximately twice as many occurrences of mortgage refinancing over the year leading up to self-employment entry. We also observe higher refinancing rates in the period after entering self-employment, though less markedly so. This evidence indicates that the self-employed appear more likely to refinance prior to entering self-employment, but also have higher refinancing rates once self-employed. Therefore, when estimating the impact of house price shocks on mortgage refinancing by households prior to entering self-employment, we need to control for the possibility that the self-employed are more prevalent mortgage refinancers due to unobserved characteristics.[13]

We use the following strategy. We estimate a reduced-form mortgage refinancing model embodying a selectivity correction for whether the household chooses to become self-employed. The dependent variable is a dummy variable for whether the household refinanced its mortgage between 1994/5 or 1999/2000. The refinancing decision is then modelled as a function of household characteristics utilised in table 2, plus dummy variables for a taking the value 1 if the cumulated house price shock in the county in which the household is positive and 0 otherwise, as well as for whether the household moved house between waves. The selectivity-correction on self-employment is identified off the polynomial in household wealth and a dummy variable for whether the household had experienced a spell of self-employment within the last three years. We then calculate the marginal effects on the house price shocks separately for the self-employed and other households and examine whether there are significant differences between the two groups.

[13] Or indeed that they continually refinance their self-employed business.

Table 7 presents probit estimates and conditional marginal effects. The p-value on the likelihood ratio test for independent equations is 0.012, suggesting a degree of correlation in the error terms between the two equations. The coefficients in the refinancing equation reveal that the probability of a household refinancing its mortgage between 1994/5 or 1999/2000 rises sharply with the household moving home between those waves and also with the observation of a positive house price shock. However conditional marginal effects in Columns 2 and 3 indicate that in the selectivity-corrected estimates households subsequently entering self-employment are no more likely to refinance in response to a positive house price shock than households not subsequently entering self-employment.

They results strongly suggest that the relationship between house price shocks and self-employment entry observed in Table 3 is driven by the higher refinancing rates among households with a higher propensity to enter self-employment rather than a direct causal relationship between financially constrained experiencing a house price shock, utilising the shock to collateralise through mortgage equity withdrawal and then subsequently to enter self-employment. The absence of any direct evidence that house price shocks cause households entering self-employment disproportionately to increase their refinancing rates suggests that while households do indeed utilise housing wealth as collateral to fund self-employment entry, house price 'windfalls' are not disproportionately unbinding constraints for would-be self-employed households.

6. Conclusion

This paper has examined the impact of household wealth on transition to self-employment in a UK panel data set using values of recently received inheritances and house price movements as instruments for financial wealth. The existing literature indicates that household self-employment entry is predicted by household wealth and also by receipt of 'windfall' payments such as inheritances, lottery winnings and bonus payments. This relationship pointed towards the existence of liquidity constraints preventing low wealth households form entering self-employment.

By exploiting the panel dimension of the data set used in this paper, entry to self-employment is shown to be weakly dependent on household net worth. Controlling for household characteristics, incomes, educational background and

recent labour market experience an increase in net worth of £100,000 is associated with a 27% increase in the probability of entering self-employment. This relationship is also shown to be non-linear: the association between wealth and transition appears to be driven by households at the higher end of the wealth distribution.

However, the findings from instrumental variable regressions call into question the existence of financial constraints to self-employment. Using values of inheritances received in the period leading up to and soon after household embark upon self-employment, both past and future inheritances are shown to predict self-employment entry. This result, in line with findings by Hurst and Lusardi (2004), indicates that the value of inheritances is most likely not measuring shocks to liquidity but rather the increment of household wealth over the life-cycle, and/or the underlying propensity to become self-employed.

Housing wealth is potentially an alternative instrument for financial liquidity. Although house price movements do not provide financial windfalls to households as the value of housing equity is tied-up in the home, they do endow households with additional collateral against which potential entrepreneurs can secure finance through mortgage markets. Given that housing is a dominant asset in household portfolios, house price changes explain much of the variation in household net worth, especially in the later period considered, and is therefore associated with self-employment start-ups. However, when we estimate the *unanticipated* component of house price movements as the residuals from an AR2 process, and use this alternative instrument, the evidence for shocks to household liquidity impacting transition into self-employment is weakened.

We then considered whether households entering self-employment systematically have higher probabilities of refinance when they obtain positive house price shocks. Controlling for other important determinant of remortgaging activity (notably, moving house), and control for the self-selection into self-employment, we find no evidence of differential refinancing rates in response to house price 'windfalls'. This does not rule out that some households are liquidity-constrained; merely that households that are setting up businesses behave no differently from other households when they receive windfall gains.

What are the policy implications of the study? The findings suggest that, since households with greater wealth are more likely to start-up businesses, start-up costs may not be trivial. In particular, the role of housing equity as collateral seems important, as in Black *et al* (1996). Forward-looking households should therefore accumulate capital to engage in start-ups, but it is a strong step from that to argue that start-ups are thereby limited by financial constraints. Indeed, when we use instruments to measure (the unravelling of) financial constraints, the results are weak, in contrast to some other studies of the UK. Specifically, the paper calls into question the validity of so-called financial 'windfalls' as strong instruments for household liquidity. This study does not claim that households can engage in perfect credit markets, nor that all of the existing evidence for financial constraints is implausible. Rather, it calls for better tests of the financial constraints hypothesis.

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Table 1

Descriptive Statistics of New Self-Employed and Non-Self-Employed: Pooled 1995/2000 Sample

Variable	Subsequent Non-Self-Employed (N=7,639)	Subsequently Self-Employed (N=198)	p-value of Difference
Age	41.67	42.29	.56
Education Dummy			
HND	.07	.09	.22
O-level / GCSE	.33	.30	.45
A-level	.19	.19	.99
Degree	.13	.18	.08
Ethnic Minority	.03	.08	<.01
Female	.54	.38	<.01
Married	.81	.88	.04
Homeowner	.74	.83	<.01
Average family labour income, previous 5 years.	£25,539	£29,813	.02
Household self-employed, previous 5 years.	.12	.38	<.01
Household net worth	£61,344	£102,892	<.01

Sample: all households in BHPS aged over 21 and non-retired that were not in self-employment in either 1995 or 2000 and subsequently remained in the BHPS for one additional year. All values in 1995 pounds. Personal characteristics are for the head of household. All statistics are means.

Table 2

Probit Estimates of Household Entry to Self-Employment: Pooled 1995/2000 Sample (N=7,837)				
Variable	Column 1		Column 2	
	Probit Coefficients	Marginal Effects	Probit Coefficients	Marginal Effects
Age	–0.013**	*–0.0002***	–0.02**	*–0.0002***
	(0.006)		(0.006)	
Female	–0.01	*–0.002*	–0.01	*–0.002*
	(0.12)		(0.11)	
Married	0.001	*0.0004*	–0.001	*–0.0003*
	(0.23)		(0.22)	
Divorced	0.32	*0.009*	0.31	*0.008*
	(0.29)		(0.28)	
Ethnic Minority	0.51**	*0.017***	0.52**	*0.018***
	(0.22)		(0.22)	
No. Children	–0.04	*–0.0008*	–0.03	*–0.0005*
	(0.06)		(0.05)	
Education:				
HND	0.20	*0.005*	0.17	*0.004*
	(0.24)		(0.23)	
O-level / GCSE	0.16	*0.004*	0.13	*0.002*
	(0.17)		(0.16)	
A-level	0.06	*0.001*	0.05	*0.0009*
	(0.19)		(0.18)	
Degree	0.07	*0.002*	0.08	*0.002*
	(0.20)		(0.19)	
Self-employed last 3 years	0.78***	*0.029****	0.78***	*0.03****
	(0.11)		(0.12)	
Household labour income/£100,000	0.16	*0.0032*	0.19	*0.0038*
	(0.21)		(0.22)	
Networth/£100,000	0.14***	*0.0027****	0.07	*0.001*
	(0.05)		(0.23)	
(Networth/£100,000)^2			0.02	*0.0004*
			(0.11)	
(Networth/£100,000)^3			0.04	*0.00006*
			(0.04)	
(Networth/£100,000)^4			–0.001	*-0.00004*
			(0.007)	
(Networth/£100,000)^5			0.0002	*0.000003*
			(0.0005)	
Pseudo R^2	0.114		0.124	
p-value joint significance of Net Worth variables	0.01		0.05	

Sample: all households in BHPS aged over 21 and non-retired that were not in self-employment in either 1995 or 2000 and subsequently remained in the BHPS for one additional year. All values in 1995 pounds. Personal characteristics are for the head of household. Observations of 7,837 households (198 entering self-employment, 7,639 remaining in paid employment in subsequent year) Marginal effects calculated at variable means.

Table 3

IV Estimates of Household Entry to Self-Employment (Coefficients)						
	2000 Sample (N=4,469)		1995/2000 Sample (N=7,837)			
Variable	1. Past Inheritances	2. Future Inheritances	3. Past House Price Changes	4. Future House Price Changes	5. Past House Price Shocks	6. Future House Price Shocks
Age	–0.001	–0.001	–0.002	–0.001	–0.004	–0.005
	(0.001)	(0.001)	(0.003)	(0.004)	(0.003)	(0.003)
Female	–0.001	–0.002	–0.004	–0.004	–0.006	–0.012
	(0.003)	(0.003)	(0.006)	(0.003)	(0.005)	(0.008)
Married	–0.003	–0.003	–0.005	–0.006	–0.01	–0.008
	(0.004)	(0.005)	(0.008)	(0.007)	(0.06)	(0.06)
Divorced	0.23	0.19	0.18	0.21	0.16	0.28
	(0.20)	(0.20)	(0.21)	(0.22)	(0.23)	(0.19)
Ethnic Minority	0.37**	0.34**	0.28**	0.26**	0.39***	0.45***
	(0.14)	(0.12)	(0.10)	(0.11)	(0.12)	(0.13)
No. Children	–0.03	–0.02	–0.02	–0.03	–0.03	–0.05
	(0.05)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)
Self-employed last 3 years	0.51***	0.46***	0.41***	0.40***	0.53***	0.58***
	(0.18)	(0.16)	(0.15)	(0.16)	(0.16)	(0.20)
Household labour income/£100,000	0.12	0.16	0.10	0.10	0.11	0.13
	(0.19)	(0.18)	(0.16)	(0.16)	(0.10)	(0.09)
Networth/£100,000 variable instrumented by inheritance / house prices.	0.16**	0.14***	0.18***	0.17***	0.02**	–0.01
	(0.06)	(0.04)	(0.05)	(0.06)	(0.01)	(0.09)
F(16, 2896)	10.19	12.83	9.76	10.46	6.15	6.01
Prob>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj. R-Squared	0.08	0.09	0.08	0.09	0.05	0.04

Notes on Table 3

The sample used for the regressions shown in columns 1 and 2 is all households in BHPS aged over 21 and non-retired that were not in self-employment 2000 and subsequently remained in the BHPS for one additional year. (Values in 1995 pounds). The results in columns 3-6 are for all households in BHPS and non-retired that were not in self-employment in 1995 or 200 and subsequently remained in the BHPS for one additional year Personal characteristics are for the head of household. Observations of 7837 households (198 entering self-employment, 7639 remaining in paid employment in subsequent year). Additional regressors: dummies for educational attainment (see Table 2).

Table 4

Distribution of House Price Movements, BHPS Home-owning Households 1992-1994 and 1997-1999		
At 1995 prices	1992-1994	1997-1999
<0	88.1	0.2%
0 – 10000	11.9%	9.3%
10000 – 20000	-	15.8%
20000 – 30000	-	19.7%
30000 – 40000	-	11.4%
40000 – 50000	-	9.1%
>50000	-	34.5%
Average Change	£–2,675	£34,945
Median Change	£–3,016	£32,901

Table 5

AR(2) Estimates for County Level House Prices, plus residual statistics. 1990-1999	
Average House Price (£)	Coefficient (Std. Err)
Average House Price *t-1*	0.91 (0.12)
Average House Price *t-2*	–0.02 (0.04)
No. Observations	780
No. Groups	65
F (12,703)	893.34

Table 6

Mortgage Refinancing of New Self-Employed and Non-Self-Employed: Pooled 1995/2000 Sample (7,837)		
	% Households Refinancing per annum	
	1 year prior to 1995/2000	1 year after 1995/2000
Remaining outside self-employment	18.2%	18.8%
Entering self-employment in 1995/2000	38.7%	26.3%

Table 7

House Price Shocks, Mortgage Refinancing and Self-Employment Selectivity-Correction Estimates (N=7,837)			
Household refinances mortgage (1994-5, 1999-2000)	*1. Coefficients*	2. Marginal Effect conditional upon entering self-employment.	3. Marginal Effect conditional upon remaining non-self-employed
Age	0.29 (0.38)	0.1	0.08
Female	–0.39 (0.29)	–0.12	–0.13
Married	0.13 (0.66)	0.4	0.5
Divorced	1.39 (0.78)	0.51	0.46
Ethnic Minority	–0.34 (0.56)	–0.10	–0.12
No. Children	0.26 (0.15)	0.09	0.06
Household labour income	0.02 (0.09)	0.007	0.015
Home Mover	2.17*** (0.62)	0.71	0.58
Positive House Price Shock	1.01** (0.47)	0.11	0.09
Household becomes self-employed (1994-5, 1999-2000)	*Coefficients*		
Networth/£100,000	–0.16 (0.20)		
(Networth/£100,000)^2	0.05 (0.1)		
(Networth/£100,000)^3	0.01 (0.03)		
(Networth/£100,000)^4	–0.01 (0.01)		
(Networth/£100,000)^5	0.0002 (0.0004)		
Self-employed, previous 3 years.	0.86*** (0.11)		
ρ	–0.29 (0.19)		
Waldχ^2(9) Prob>χ^2 LR test of ind. eqns.	46.15 0.0002 0.012		

Notes on Table 7

Additional variables in self-employment equation: variables in refinancing equation. Sample: all households in BHPS aged over 21 and non-retired that were not in self-employment in either 1995 or 2000 and subsequently remained in the BHPS for one additional year. All values in 1995 pounds. Personal characteristics are for the head of household. Observations of 7,837 households (198 entering self-employment, 7,639 remaining in paid employment in subsequent year) of 198 households entering self-employment 68 refinance, of 7,639 households remaining outside self-employment, 481 refinance. Marginal effects calculated at variable means.

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