Analysis of linked PASSPORT and FAME data for UKTI

Stage 1 Report

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Executive summary

This report analyses the characteristics, survival and performance of firms that used the Passport scheme between April 2003 and Sept 2004. This is done by comparing 3,648 Passport firms to FAME December 2006 data.

Firm characteristics

Passport firms[1] are slightly older than comparable FAME firms, more heavily located in North and Midlands and, in keeping with this, more likely to be in manufacturing. The analysis also shows an over-representation of Passport firms in *Wholesaling*, and an under-representation in *Computer and Related Activities* and *Other Business Activities*. Passport firms are more likely to have a parent holding company.

Passport firms have higher total assets and turnover than FAME firms. Their return on assets is lower – at around 4% compared to 7% – although the distribution of the return on assets for Passport firms is more compact. Passport firms also tend to have higher liquidity ratios.

The results show that Passport firms have larger overseas turnover (£3million versus £0.2 million for FAME), although only 10% of Passport firms contain this variable in FAME. However, looking at intensity (i.e. overseas turnover / turnover), Passport firms are lower with a median of 12% compared to a FAME median of 21%. This reflects the Passport eligibility criteria that targets new-to-export firms and excludes firms with export intensity above 25%.

Performance

An initial approach to understanding how the Passport scheme may impact on firms' performance is to analyse the survival of firms. The FAME database divides firms into 'active' and 'inactive'. The largest category of 'inactive' firms is 'dissolved', followed by 'live/non-trading' and 'liquidated'. If we treat any firm in these categories as 'failed', we find that Passport firms have a higher survival rate (the estimates imply around 4% higher). This result is based on controlling for a range of other firm characteristics, such as age, size and industry. However, if we treat only the 'liquidated' category as representing a firm that

[1] Note that these observations simply compare firms that received the PASSPORT scheme with those that did not, unconditional on the selection criteria for participating in PASSPORT, i.e., unconditional on having an export turnover of less than 25%.

has failed to survive we find the reverse: Passport firms are around 1% more likely to fail.

An alternative approach to assessing performance is to look at financial data. To do this only ‘active’ firms’ are analysed and we use a propensity score matching estimator. This creates a ‘control group’ of similar firms to Passport from the FAME data. The analysis then compares the control group to firms that did use Passport. The results indicate that Passport firms had higher total assets and turnover growth than similar firms in FAME. The estimates imply Passport firms’ assets grew by around 7% faster per year over the 2002 to 2005 period; turnover growth was 6% faster (or more). Although we also analysed the growth of profits and overseas turnover the results found no significant differences in growth rates.

1. Introduction

This report contains an analysis of the characteristics of firms that used the UKTI Passport scheme in 2003-04 in comparison with all UK companies listed in FAME. The results of this analysis are contained in section 2. The report then provides a provisional analysis of the performance of Passport firms in comparison to a control group of FAME firms. The relative performance of Passport firms is assessed in two ways. First, we analyse whether the survival rate of firms varies with participation in Passport (section 3). Second, we use financial accounting data to analyse how Passport firms have performed relative to non-Passport firms (section 4). Using financial data is problematic since Passport firms could be using the scheme in 2004, which leaves only one year of data (2005) to assess post-program performance. Furthermore, financial data in FAME on the performance of many Passport firms is limited. Nevertheless, by using a range of variables and techniques we feel that we can draw some conclusions about the effectiveness of Passport.

1.1. Background

Previous research for UKTI has established a match between Passport firms and the FAME database (Feb 2006 edition).[2] This represents a success rate of 74%. The PASSPORT firms participated in the scheme between April 2003 and Sept 2004.

Due to the in-built regulatory delays in reporting accounts, the FAME Feb 2006 data only had full year accounts up to and including 2004. Therefore, in this research, the FAME Dec 2006 data is used. This allows a greater coverage of company accounts that end in 2005.

The broad characteristics of the FAME Dec 2006 data are as follows. There are around 2.4 million ‘active’ companies listed in the database. All of these companies have basic information, such as name, registered address, directors and registered number. For companies that have filed a set of annual accounts there is also financial data available. The extent of this financial data varies substantially across firms, since the smallest firms (legally) need only report very basic balance sheet data. The FAME data also lists around 0.9 million ‘inactive’ limited companies. As discussed in section 3, ‘inactive’ can refer to

[2] Full details of the matching analysis are contained in "Interim report on matching ‘Passport’ to FAME" (Report submitted to UKTI, 3rd May 2006) and "Matching UKTI Passport and FAME: a review of data availability" by Mark Rogers (Report submitted to UKTI, dated 13th September 2006). These are included in

companies that have been dissolved, liquidated, entered receivership or declared non-trading.

2. The characteristics of Passport firms

This section contains an analysis of the characteristics of firms that used the UKTI Passport scheme in 2003-04 in comparison with all UK companies. Initially we look at four characteristics of the firm: incorporation year, industry, geographic location and ownership. Data on these variables are available for almost all firms in FAME. Next we look at four key financial variables: total assets, profitability, liquidity, turnover and overseas turnover. The availability of these data varies across firms. The statistics presented below are based on 2004 data.[3]

2.1. Incorporation year

The age distribution of firms in any economy is skewed towards younger firms. In general, there are a large number of 'start-up' firms but relatively few of these survive for 5 years or more. For example, in the FAME data around 16% of firms were incorporated in 2006; whereas, for example, only 4% were incorporated in 2000. This issue also highlights the issue of which cohort of FAME firms should we compare the Passport firms.

The fact that Passport firms used the scheme in 2003/4 implies that they were trading – or soon to be trading – at that time. In fact, out of the Passport firms, 53 (1.6%) were officially incorporated in 2005 and 6 (0.2%) were incorporated in 2006. Despite this, we argue that it is more realistic to compare Passport firms with the cohort of FAME incorporated in 2004 or before. If we do not do this we end up comparing Passport firms with a large number of 2005 and 2006 FAME firms. Importantly, very few of these have financial data since these firms need not report their first accounts until 22 months after incorporation date.[4]

Figure 1 shows a frequency plot of non-Passport firms and Passport firms by year (up to 2004). There are 1.67 million non-Passport firms and 3,164

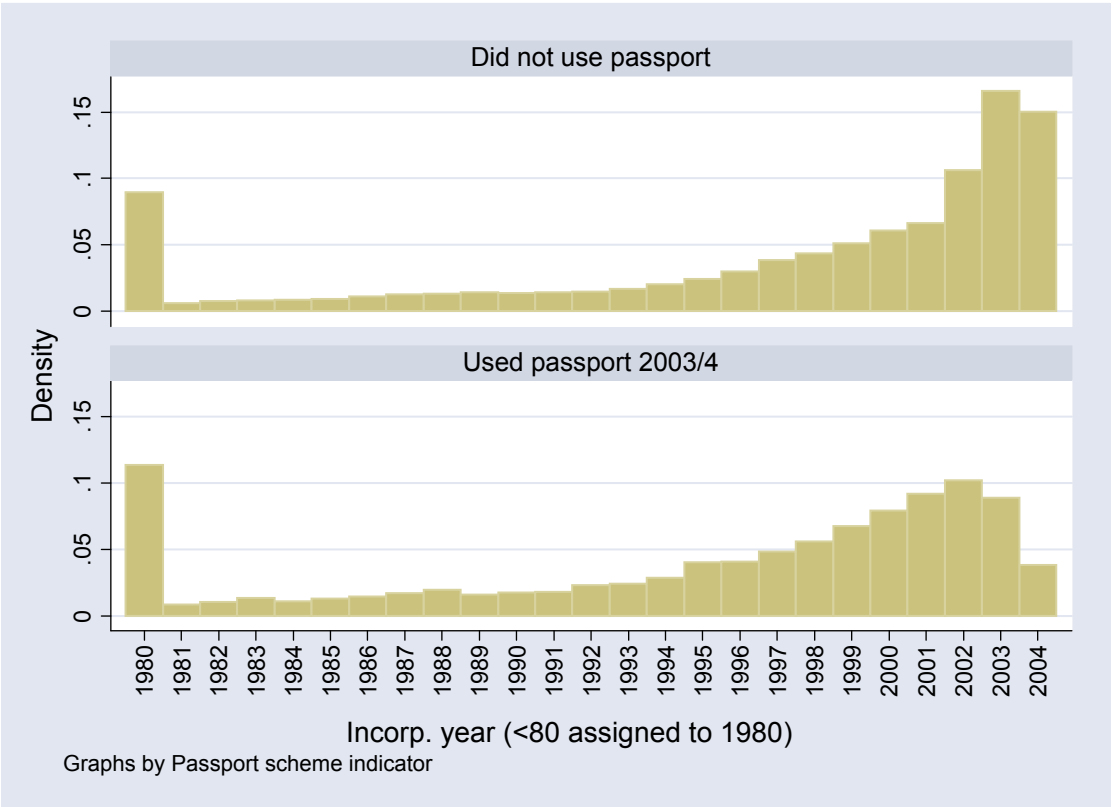
[3] We checked the results using 2003 data and, at times, previous years. In all cases the statistics were similar whatever year was used.

[4] Companies House states "If you are filing your company's first accounts and they cover a period of more than 12 months, they must be delivered to the Registrar within 22 months of the date of incorporation for private companies and 19 months for public companies". If the accounts cover 12 months or less then you have 9 months from the accounting reference date.

Passport firms represented in these two plots (the complete percentages and numbers for these are in Appendix 2).

The plots clearly show that Passport firms are under-represented in 2003 and 2004, as might be expected. In contrast, the Passport firms are over-represented in the pre-1980 group (11% vs. 9%). The rest of the distribution is hard to compare given these features but there appear no strong differences.[5]

Figure 1 Incorporation year of FAME and Passport



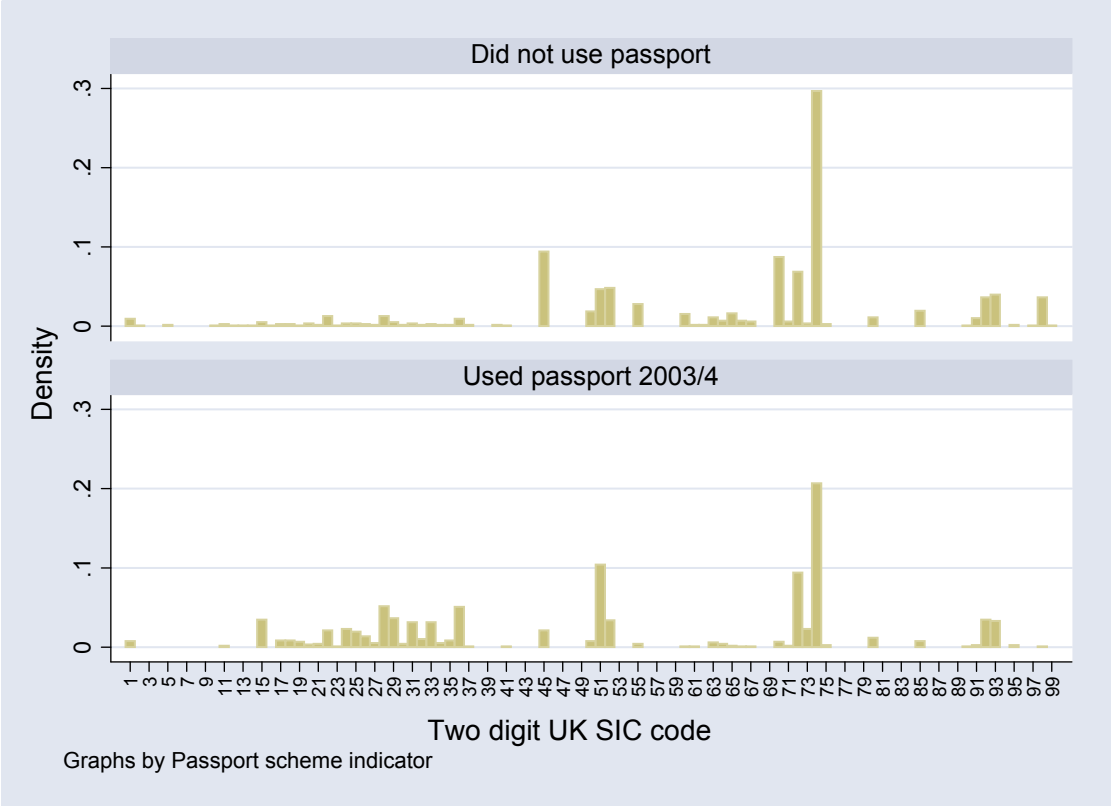
2.2. Industry

In this section we use the UK SIC classification system to analyse how Passport firms compare with the population of UK firms. Figure 2 shows a histogram of all the two-digit SIC codes in the data. It is clear that relatively few industries account for the dominate share of firms in the economy. For example, the highest peak is for SIC 74 – Other Business Activities e.g. legal, accounting and

[5] This impression is confirmed if we cross-tabulate pre-2002 and pre-2000 data since we find no significant differences using a chi-squared test. In contrast, the cross-tabulation of data in Figure 1 reveals statistically different distributions.

advertising – with 29.6% of all UK firms (20.7% of Passport firms are in this industry). As might be expected, the Passport firms are over represented in the manufacturing sectors (SIC 15 to 36).

Figure 2 Primary industry classification of FAME and Passport



We have also analysed the 4-digit breakdown for the most common industries found in Passport (i.e. those industries with more that 5% of total: 28, 36, 51, 72 and 74). For these industries, the two manufacturing industries (28 and 36) are over-represented in Passport, as is industry 51 (*Wholesale industries*). In contrast, industries 72 and 74 are under-represented in Passport compared to FAME.

Industry 28 is *Manufacture Fabricated Metal, Not Machines* and, for the population of FAME firms, the most common sub-industries are: *Manufacture metal structures & parts* (SIC 2811) with 16.6% of firms; *General mechanical engineering* (SIC 2852) with 41.2%; and *Manufacture other fabricated metal products* (SIC 2875) with 26.8%. In comparison, the Passport set of firms have percentages 13.6%, 34.0% and 35.2% respectively. There are 162 Passport firms in industry 28, which means that within many four digit sub-industries the numbers are less than ten and, moreover, a statistical test of differences in distribution between Passport and population cannot reject equality at 15% level. The full table of results is shown in Appendix 2.

The full results for the sub-industry breakdown for *Manufacturing nec* (36),

Wholesale industries (51), *Computer and Related Activities* (72) and *Other Business Activities* (74) are also shown in Appendix 2. For *Manufacturing nec* (36) there are a range of small differences between FAME and Passport, but one notable difference is under-representation in *Passport of Manufacture of jewellery & related* (SIC 3622) with 6% of FAME firms but only 2% in Passport). For *Computer and Related Activities* there is a slight under-representation in SIC 7200, but Passport over-represents in a number of other sub-industries.

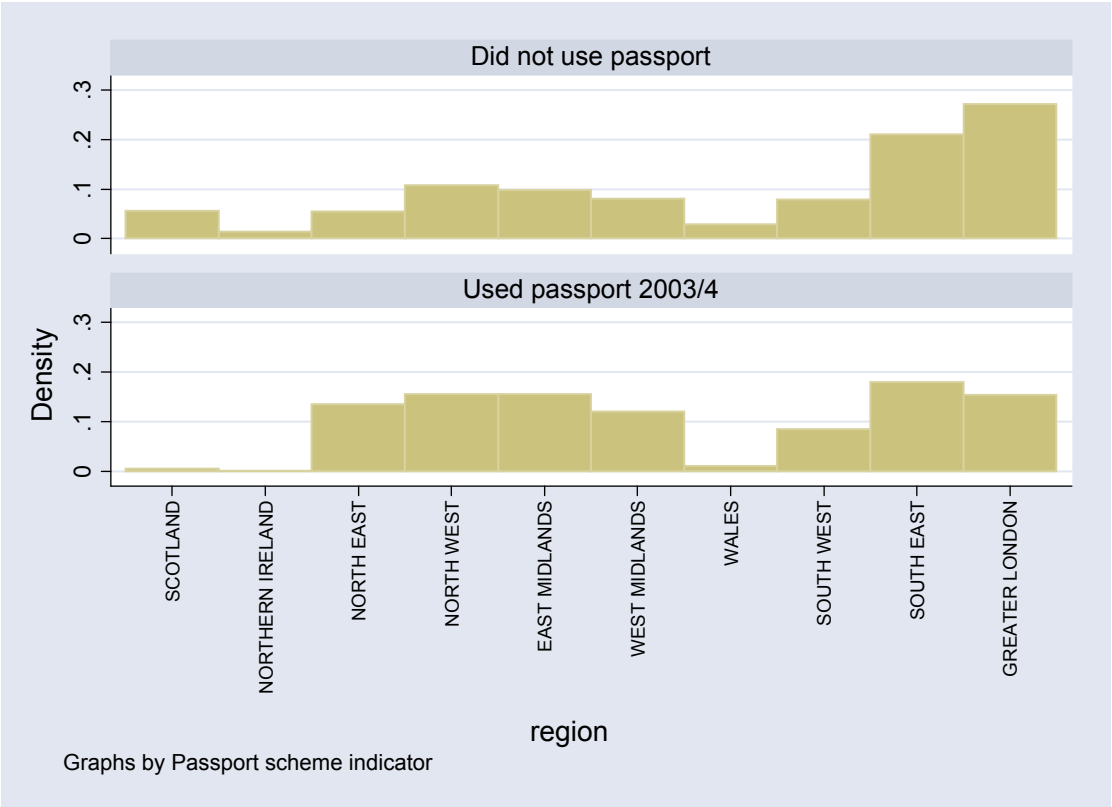
This industry analysis is based on simple comparisons between FAME and Passport firms. It would also be interesting to compare Passport with export data (although there are difficulties in obtaining such data). Similarly, in Stage 2 of this project it will be possible to compare Passport industry coverage to industry-based data on European patent and trade mark activity.

2.3. Geographical location

Figure 3 shows a breakdown of FAME and Passport companies by major region. In short, Passport firms are over-represented relative to the population in the North and Midlands and under-represented in the South East and London. Scotland, N. Ireland and Wales are also under-represented in Passport.

A more detailed analysis of two-digit postcodes confirms the basic regional differences. For example, around 4% of FAME firms are located in “GU” (Guildford), but only 2% of Passport firms. Whereas, 0.4% of FAME firms are in “LA” (Lancaster) compared to 1% of Passport firms. Full details of the regional breakdown can be produced by the authors but is not included here due to its length. Some of these regional differences are likely to be related to the industry differences highlighted above. Further analysis could also analyse the regional aspect of UK exports or international intellectual property activity.

Figure 3 Regional distribution of FAME and Passport



2.4. Ownership

The FAME database contains a variable that indicates whether the firm has a holding company that is in ultimate control.

Table 1 shows the results from comparing this variable for FAME and Passport firms. Overall, 8.4% of FAME firms have a holding company compared to 14.5% of Passport firms. This indicates that firms with a holding company – indicating it is part of a larger firm – are more likely to use Passport.

Table 1 Holding company status of FAME and Passport

	FAME firm	Passport firm
No holding company	91.6%	85.4%
	N=1,529,323	N=2,704
Has holding company	8.4%	14.5%
	N=139,509	N=460
Total	100%	100%
	1,668,832	3,164

2.5. Total assets

'Total assets' is the variable with best coverage in the FAME data. Even so, for the data analysed here only around 83% of FAME firms have total asset data (although 95% of Passport firms have total asset data).

Using data on total assets does give rise to some limitations. First, a major component of total assets are fixed assets (equipment, land, buildings) and firms can often choose whether to own these assets or to lease them. To the extent that this varies across firms any analysis may generate a misleading picture. Specifically, it may be that smaller firms rely more heavily on leasing hence use of total assets may exacerbate the differences between small and large firms. Second, many firms now rely on intangible assets rather than traditional assets. Since the information on total assets is taken from balance sheet data, prepared by accountants following set accounting rules, many forms of intangible assets are not capitalised into 'total assets' in the balance sheet. Examples are forms of intellectual property, investment in training and reputation. There are some cases when such forms of investment are capitalised into assets, but these are relatively rare (often only when a company if bought does the valuation include such intangibles).

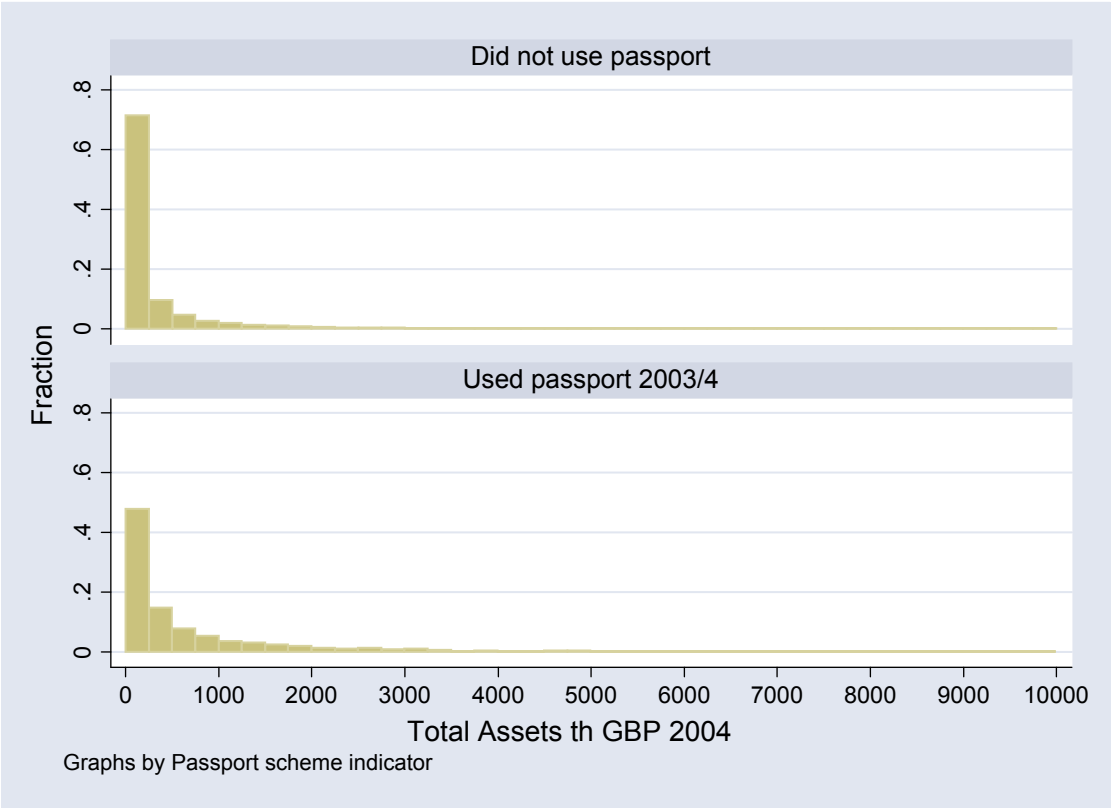
Although total assets have some limitations, it must also be recognised that its value is the sum of current assets and long term assets. Current assets include cash, deposits, inventories and accounts receivable (due within one year). Long term assets include fixed assets discussed above, but also any other form of long term asset. Given this, total assets do capture an importance aspect of firm performance.

The distribution of total assets – like any other firm-level financial data – is typically dominated by right-hand skewness: there are always a small number of

firms with very high values. This reflects the composition of an economy with a small number of very large companies (e.g. the FT100). These data are no different. Of the 3,164 Passport firms with total asset data in 2004, 61 firms have total assets over £10 million (see Appendix 2). The highest asset figure is for Capita Business Services Ltd (£675million). Since the Passport scheme is meant for small and medium size firms this represents an oversight at some stage.[6]

The median total assets in 2004 for a Passport firm is £268,000, compared with £45,000 for FAME firms. In contrast the mean values are £1.9m (Passport) and £18.7m for FAME. However, the mean is heavily influenced by large firms and FAME contains all the largest UK firms. Figure 4 shows histograms of the distribution of total assets for FAME vs. Passport firms for those firms with less that £10m in assets. The skewness of the data even with this limit can easily be seen. What is also apparent is that the Passport firms tend to be slightly larger. This is confirmed by the median reported above and also that the inter-quartile range is £927,000 for Passport and £276,000 for FAME.

Figure 4 Total assets of FAME and Passport

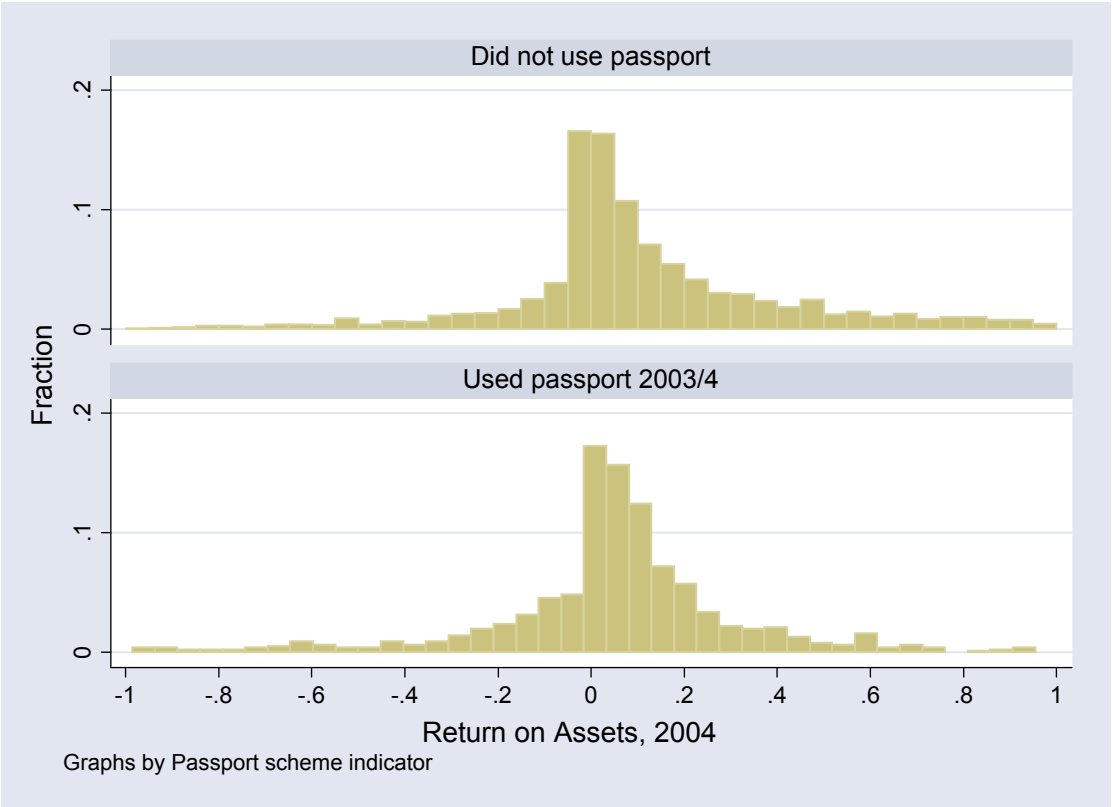


[6] The current EU definition is that a SME should have less than 250 employees, as well as turnover less than 50 million euros and less than 43 million in total assets. This assets figure implies that 11 firms in the sample should not be classified as a SME.

2.6. *Profitability*

Profit data in FAME has considerably less coverage than asset data. For firms incorporated in 2004 or before, only 24% of firms in FAME have 'net profit before tax' data. For Passport firms this figure is 27%. A standard measure of profitability is return on assets, which is defined as 'net profit before tax' divided by 'total assets'. In any large data set there are many extreme values for such a ratio – the minimum value is -61,676 and the maximum is 213,313 – caused by the fact that profits can be positive or negative and the denominator can be very small. This means that it is best to look at the median as a measure of central tendency. The median FAME return on assets is 0.076 (or 7.6%), compared to Passport firms with 0.044 (or 4.4%). The inter-quartile range is 0.42 for FAME and 0.23 for Passport. Hence, although Passport firms are under-performing relative to the population in terms of the median they have a more compact distribution. Figure 5 plots the histograms (with each limited to between -1 and +1, where the vast bulk of the distribution is). This figure also confirms the finding that Passport firms have a tighter distribution albeit with a lower median.

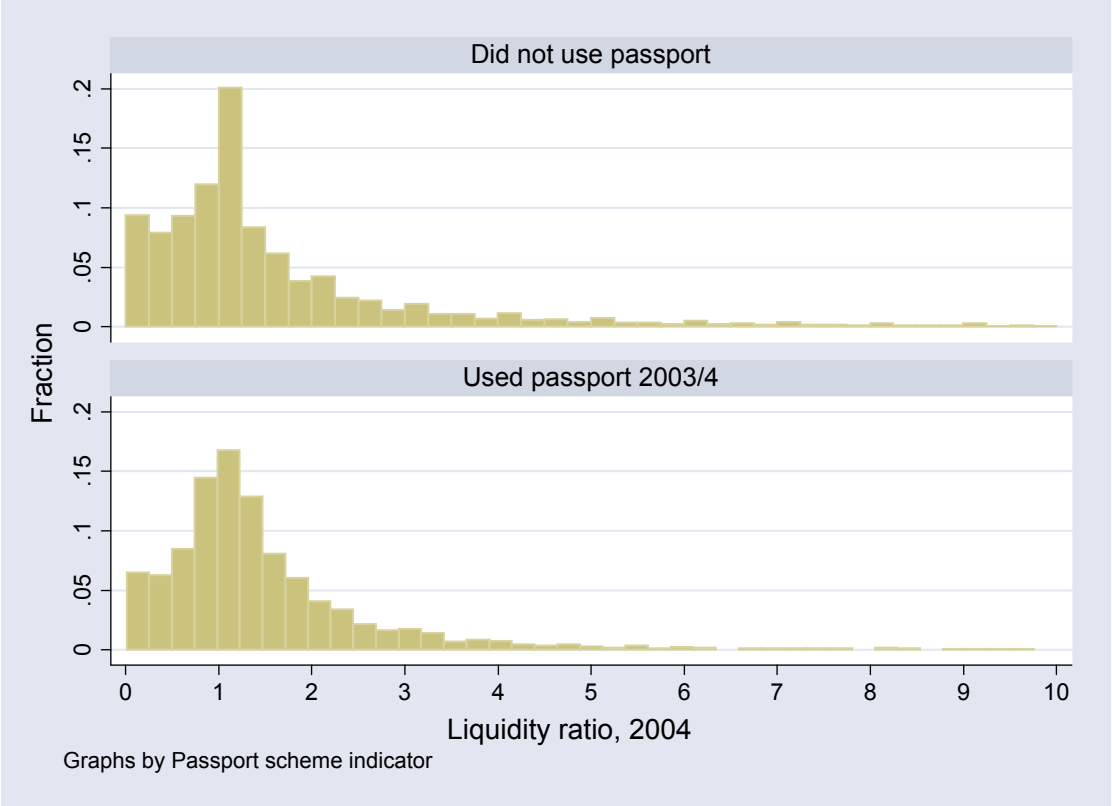
Figure 5 Profitablity of FAME and Passport



Another summary measure of firm performance is the liquidity ratio – defined as the ratio of current assets to current liabilities. Relatively high values indicate that the firm is trading successfully. For data in FAME in 2004, this ratio is available for around 66% of firms (91% of Passport firms). The median value of the liquidity ratio is 1.08 for FAME firms and 1.18 for Passport firms. Figure 6

plots the distributions and confirms the relative strength of Passport firms using this measure.

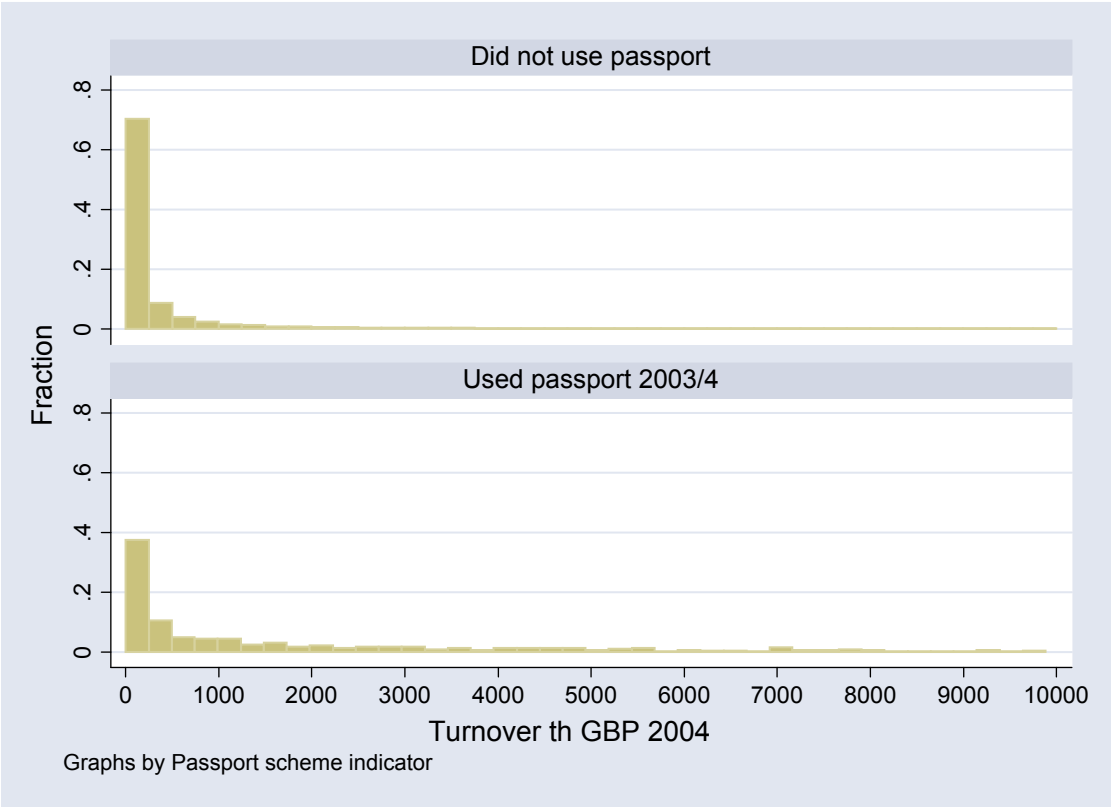
Figure 6 Liquidity of FAME and Passport



2.7. Turnover

For FAME firms incorporated in 2004 or before, around 20% of firms have data for turnover (for Passport firms the coverage is 23%). The median value for FAME firms is £88,000 compared to £984,000 in Passport. The inter-quartile range is £590,000 for FAME firms, but much higher at £4.6m for Passport firms. The Passport firms are, by this measure, much larger than the population of FAME firms. Figure 7, which only shows firms with less that £10 million turnover, confirms this feature of the data (and also shows the skewed nature of the data on turnover).

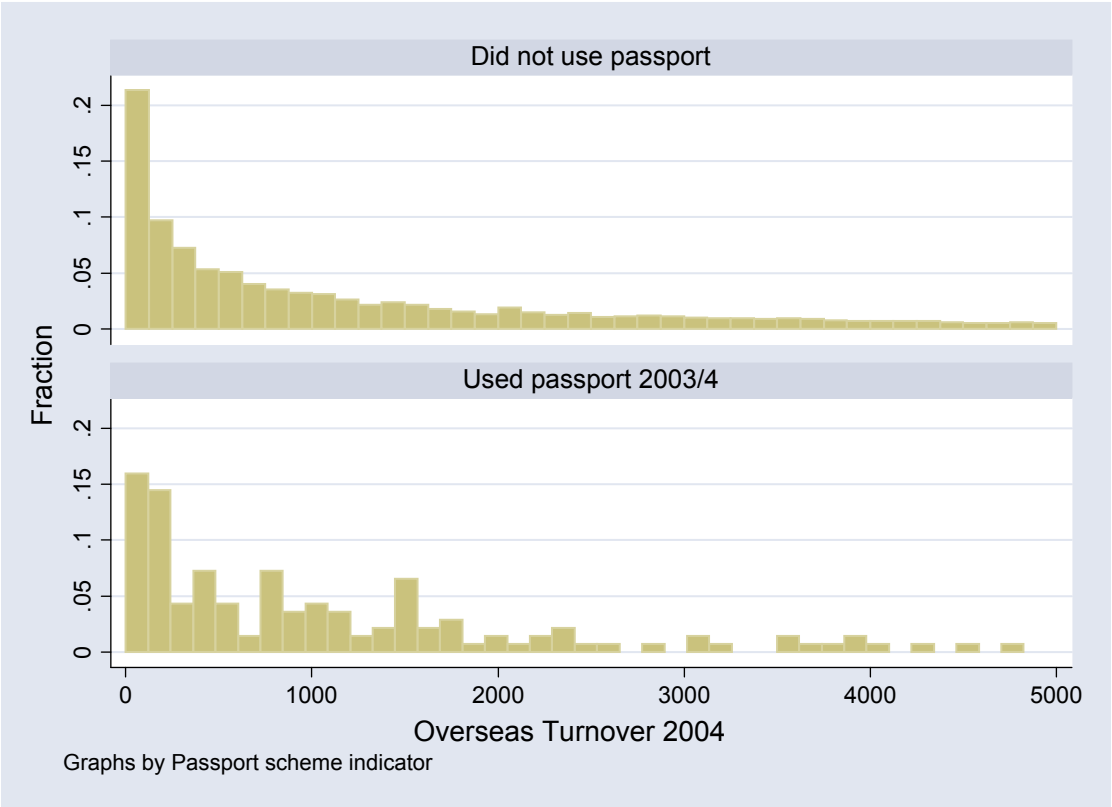
Figure 7 Turnover of FAME and Passport



2.8. Overseas turnover

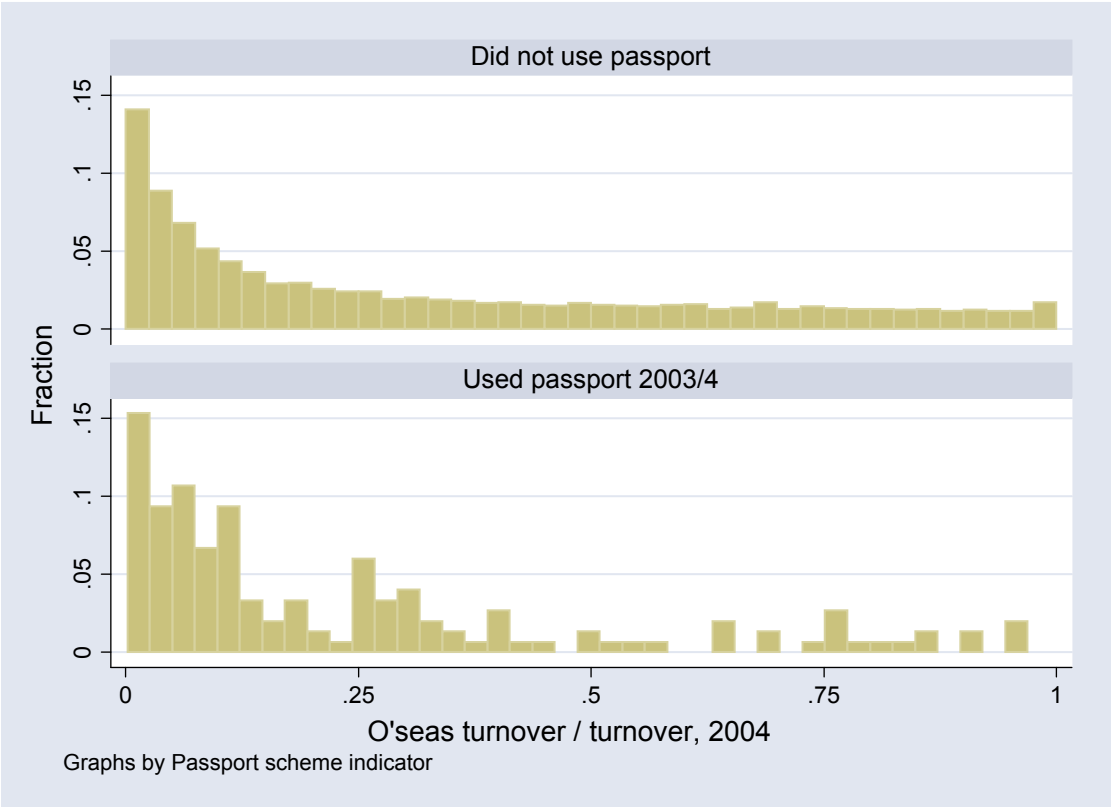
The FAME data contains a variable for overseas turnover. In general, overseas turnover is the sum of exports and the turnover of overseas subsidiaries, although for many smaller firms it is likely to comprise entirely of exports. Overseas turnover is available for 6% of the firms in FAME and 10% of Passport firms (or 304 firms). The median value for these Passport firms is £3 million, while for the FAME firms that have non-zero overseas turnover the median is 0.2 million. Hence, Passport firms are much more active in overseas markets as one would expect given the nature of the program. Figure 8 shows plots of the overseas turnover data (excluding the highest values over £5 million).

Figure 8 Overseas turnover of FAME and Passport



However, looking at intensity (i.e. overseas turnover / turnover), Passport firms are lower with a median of 12% compared to FAME of 21%. The mean values are 24% (Passport) and 32% (FAME). Figure 9 plots the data behind these statistics. These findings may indicate that the Passport scheme is, to some extent, attracting the larger exporters but not the high intensity exporters.

Figure 9 Intensity of overseas activity of FAME and Passport



3. Survival analysis

An initial approach to understanding how the Passport scheme may impact on firms' performance is to analyse the survival of firms. The FAME database divides firms into 'active' and 'inactive', where 'inactive' is one of the five categories shown in the first rows of Table 2. The table shows information on the 2.6 million firms that were incorporated in or before 2004. For these firms the table shows their status on the FAME database in December 2006. For example, for non-passport firms around 26% of these '2004 and before' firms had been dissolved. The category 'dissolved' means that the firm has voluntarily informed Companies House that it has ceased to trade. As the table shows, the Passport firms are under-represented in this group. In contrast, of the Passport firms, 3.6% have been "liquidated" by Dec 2006 in comparison to 2.7% of non-Passport firms. Companies House has two different types of 'liquidation': voluntary or non-voluntary. In short, the former is when the directors or creditors have agreed to liquidate the company, whereas the latter is when a creditor(s) has a court action to appoint a receiver. The 'receivership' category is related to involuntary liquidation since this indicates the firm has an appointed receiver who is in process of deciding the fate of the firm. The 'removed' category – which is extremely small with only 144 firms – is when Companies House decides to remove the firm, presumably because there has been a long period of no contact with the firm. The 'live/non-trading' category is when a firm is no longer actively trading, or carrying on its main business, but may still hold

assets or investments.

Table 2 Company status (firms incorporated in 2004 or before)

Company status	FAME firms %	Passport firm %
Dissolved	26.1	6.4
Liquidated	2.7	3.6
Receivership	0.4	1.3
Removed	0.1	0.0
Live/Non-trading	6.1	1.9
Active	64.7	86.8
	100%	100%
Total	N=2,568,796	N=3,648

Note: A Pearson chi 2 test for indicates that the differences between the groups are significant at 1% level. There are 3,648 Passport firms that match the Dec 2006 FAME data disc, which compares to 3754 previously found in Jan 2006 FAME disc. The reasons for this fall in match rate are unclear.

Given the various categories of ‘inactive’ firms there is a difficulty in defining a ‘survivor’ firm. In our analysis we have taken two different approaches. The first is to define a ‘survivor’ as any firm that is ‘active’ or ‘live/non-trading’, since the latter may indicate that the firm has simply channelled turnover through another entity. Hence, this definition asserts that a firm that exits has either been dissolved, liquidated, placed in receivership or removed.

The second definition is more focussed. We argue that it is interesting to analyse which firms have entered into financial difficulties and therefore been forced to exit in some sense. This means only ‘liquidated’ and ‘receivership’ are firms are in this category, which we call ‘*forced exit*’ firms. Table 3 shows the cross tabulation of this variable (note the table has less observations since we exclude ‘dissolved’ and ‘removed’ firms).

Table 3 Comparison of forced exit firms

Company status	FAME firms %	Passport firm %
Forced exit firms	4.1	5.2
Active firms	95.9	94.8
	100%	100%
Total	N=1,898,356	N=3,416

Note: A Pearson chi 2 test for indicates that the differences between the groups are significant at 10% level.

The cross-tabulations in Table 2 and Table 3 do not take into account other variables that may be important in determining firm survival. Specifically, it is likely that firm size and age will alter survival probabilities. Given this, we use a probit model to analysis whether participation in Passport alters a firm's survival probability, that is the probability of a firm being active as indicated in FAME in December 2006.

The results of such an analysis are show in Table 4. The probit analysis in regression (1) controls for firm age and size, as well as whether the firm reports having a holding company. In addition, the analysis controls for two digit SIC[7] and location. The first line of the table reports the marginal effect on survival probability of a Passport firm, namely 0.045 (or 4.5%). Perhaps the best interpretation of this result is that Passport firms have some characteristic that increases their chance of survival. This could be, for example, a better product or management, or it could be due to Passport itself. Similarly, a firm with a holding company has a 9.8% better chance of survival although, once again, exactly why this is the case is not shown by the analysis.[8]

The subsequent regressions in Table 4 include some other variables to check the robustness of the initial results. As additional variables are added the sample size falls due to data availability. As can be seen from the coefficient in the Passport row, the basic results hold across the different specifications.

[7] Controlling for industry category is essential as this filters out any industry-specific effects, for example industry-specific competitive conditions or fixed cost requirements.

[8] Note that some of these estimates have to be interpreted with caution as there may be omitted variable bias. For example, assume that firms with lower productivity have a higher propensity to exit, and also that productivity is correlated with firm size. This would lead to upward bias in the coefficient of firm size since we cannot control for productivity directly. Similar considerations may apply to the turnover and profit variables included.

Table 4 Probit analysis of survivor firms

Explanatory variable	(1)	(2)	(3)	(4)
passport dummy	0.045	0.040	0.033	0.035
	(6.84)***	(5.95)***	(2.63)***	(2.34)**
Has holding company	0.098	0.092	0.074	0.065
	(24.38)***	(23.53)***	(12.38)***	(9.05)***
Ln (age)	0.022	0.026	0.037	0.039
	(12.44)***	(13.38)***	(10.74)***	(9.31)***
ln (total assets, 2002)	0.026	0.02	0.017	0.018
	(45.82)***	(34.24)***	(18.05)***	(14.99)***
Growth assets (2001-2002)		0.035	0.019	0.019
		(22.03)***	(6.74)***	(5.12)***
Growth turnover (2001-2002)			0.02	0.019
			(7.79)***	(5.33)***
Growth profits (2001-2002)				-0.003
				(1.26)
Observations	91617	78420	22716	15454
Industry dummies (2 digit)	0.00	0.00	0.00	0.00
Location dummies (2 digit postcode)	0.00	0.00	0.00	0.00

Note: The dependent variable is 'survivor' (=1 if survives, =0 if not). Since the estimation of such models is computationally intensive, the analysis uses a random 10% sample of FAME firms. The results for regression (1) have been checked with full sample and there is virtually no difference. The table shows the marginal effects evaluated at the mean of the variables, or the 0/1 effect for dummy variables. * significant at 10%; ** significant at 5%; *** significant at 1%

The other probit analysis we undertake uses the 'forced exit' definition. The dependent variable in Table 5 defines survivors as equal to 1 and 'forced exit' firms as zero. Here the analysis gives a different result to that above: Passport firms appear to be *more* likely to be in the 'forced exit' group. Once again, this indicates that some unobserved characteristic of the firms imply a higher probability of being liquidated or put into receivership (see discussion below).

Table 5 Probit analysis of forced exit firms

Explanatory variable	(1)	(2)	(3)	(4)
Passport dummy	-0.008	-0.008	-0.011	-0.005
	(3.43)***	(3.35)***	(1.76)*	(0.73)
Has holding company	0.003	0.003	0.002	0
	(2.50)**	(2.24)**	(0.90)	(0.14)
Ln (age)	0.009	0.008	0.012	0.011
	(13.83)***	(11.73)***	(6.59)***	(5.68)***
Ln (total assets, 2002)	-0.003	-0.003	-0.003	-0.002
	(13.80)***	(13.10)***	(5.70)***	(4.10)***
Growth assets (2001-2002)		0.001	-0.001	-0.002
		(2.02)**	(0.42)	(0.88)
Growth turnover (2001-2002)			0.002	0.002
			(1.32)	(1.09)
Growth profits (2001-2002)				-0.001
				(0.50)
Observations	77174	65881	16374	11288
Industry dummies (2 digit)	0.00	0.00	0.00	0.00
Location dummies (2 digit postcode)	0.00	0.00	0.00	0.00

Note: The dependent variable is 'survivor' (=1 if survives, =0 if liquidated or receivership). Since the estimation of such models is computationally intensive the following analysis uses a random 10% sample of FAME firms. The table shows the marginal effects evaluated at the mean of the variables, or the 0/1 effect for dummy variables. The results for regression (1) have been checked with full sample and there is virtually no difference.
* significant at 10%; ** significant at 5%; *** significant at 1%

This section shows that the analysis of survival finds some interesting results. First, it is unclear exactly what the 'dissolved' category of firms contains. This is important since the treatment of this group makes a large difference to the results. For example, if this group does represent failing firms, then Passport firms appear to do better than the average FAME firm (after controlling for a variety of other characteristics). However, if this group is largely made up of firms that have simply changed their on-going business to other companies then it is misleading to think of them as 'failing'.

Taking a more limited definition of survival – those firms that did not enter financial difficulties – the results for Passport firms are reversed. In this case, Passport firms appear to have a decreased chance of survival, albeit the probability is only around 1% higher. This, in itself, cannot necessarily be seen as a bad thing as it may be that Passport attracts more high risk or innovative firms. For example, equally it could indicate that exporting is, in itself, a more risky activity. Further analysis is needed to investigate these issues.

The next section focuses on firms that were active throughout the period and

asks the question whether Passport affected their performance.

4. Matching

In conceptual terms, the perfect evaluation of the Passport scheme needs to compare a firm's performance after its participation with how it *would have* performed had it not participated. Then we could calculate the difference between the two outcomes for the same firm to obtain the effect of the scheme. Obviously, this is not possible as we cannot observe the counterfactual. The next best form of evaluation would be a controlled experiment where we select two groups of firms (in a similar way to medical experiments that study the effectiveness of a drug). Again this is not generally possible so we are left with having to construct a control group for the firms that did participate in Passport. In the economic literature, this process is called 'matching' and this section reports on such an analysis.

The matching process aims to identify a control group of similar firms. The specific procedure used here is a so-called 'propensity score matching estimator'. This estimator differs from the standard matching estimator in that all the observable characteristics of a firm are summarized in the 'propensity score'. The propensity score is calculated as the likelihood with which a firm participates in the Passport scheme conditional on its observable characteristics. In brief, the first step is to compute the propensity score using a probit regression, we then pick two firms that share the same propensity score: one having participated in Passport, the other not. In terms of our regression model, both firms are equally likely to have participated in the support scheme. Assuming our model is accurate, the difference in performance over time between the two firms represents the effect of the Passport scheme for that specific value of the propensity score. Repeating this procedure for all propensity scores and aggregating over all matched pairs allows an overall estimate of the influence of the Passport scheme[9].

Despite the sophistication of this approach, there may still remain a bias as the matching estimator can only take account of the observable characteristics in FAME. It is likely that firms that participated in the Passport scheme have different unobservable characteristics (e.g. management quality or ability to innovate). This can create a bias in matching group selection. To the extent that such unobservables are time-invariant, we can purge for the bias by following

[9] This approach has an additional advantage over parametric estimation methods in that no assumption on the functional form of the effect of the support scheme on the outcome variable is required.

Blundell and Costa Dias (2000)[10] and using a combined propensity score matching and differences in differences estimation.

In order to exploit a maximum of information contained in the dataset, we use several specifications, moving gradually from a more general to a more specific specification, to estimate the propensity score.

The most general specification (1) conditions participation in the Passport scheme on the log of a firm's total assets, the age of the firm, an indicator of whether the company is a subsidiary of a holding company, region, and industry dummies. As is clear from the above analysis, this also allows the maximum sample size for the probit (matching) estimator. The second specification (2) also includes a variable for the growth in assets of a company between 2001 and 2002. Similarly, we added to the third specification (3) variables for growth in a firm's turnover and profits (2001-2002). The fourth specification also takes account of whether the company was had overseas turnover before the participation in Passport. For that purpose, the forth specification (4) includes a binary variable, indicating whether the firm had non-zero overseas turnover in 2002.

A range of different outcome variables are used. Since data availability is best for firms' total assets, we use this variable as our main outcome variable to evaluate the effect of the Passport scheme. More precisely, we use the difference between a firm's assets in 2002 and 2005 as the outcome variable. The results from this are shown in the top panel of results entitled Δassets. For specifications (1) and (2), we only evaluate this outcome variable. For specifications (3) and (4), we also estimate the effect on the difference in turnover, profits and overseas turnover. The results for each of these outcome variables is shown in a separate panel entitled Δturnover, Δprofits and Δoverseas turnover. Note that the sample size is reduced as the outcome variable changes.

We report two results in Table 6, the first one was estimated using Mahalanobis matching, the second employed nearest neighbour matching. Across the different specifications and matching methods, a number of findings emerge. The most robust is that firms that participated in the Passport scheme increased their total assets relative to those that did not. All of the coefficients shown are positive and significant (all but one at the 1% significance level). A coefficient of 0.206 indicates that PASSPORT firms experienced on average almost 21% faster growth in total assets over the 4-year period 2002-2005. This could be interpreted as a faster average annual growth rate of nearly 7% compared to

[10] Blundell, R and Costa Dias, M (2000) “Evaluation Methods for Non-Experimental Data”, Fiscal Studies, 21(4), 427-68

FAME firms. The interpretation of the remaining coefficients follows this example.

The results from using Δturnover as the outcome variable show positive coefficients even though the sample size for Passport is reduced to 211. Again the magnitude of the coefficients indicates substantial differences between Passport and non-Passport firms. Using Δprofits as the outcome variable produces positive coefficients but these are not statistically significant. Similarly, there is no statistically meaningful evidence with respect to overseas turnover. Our interpretation of these results is that the low sample size (for Passport firms) causes imprecision in estimation.

Table 6 Propensity matching results

Specification	Coefficient	P-Value	Coefficient	P-Value	Observations	
	Mahalanobis		Nearest neighbour		Passport	Control
Δassets						
1	0.2060	0.0000	0.2067	0.0000	1,582	430,959
2	0.2247	0.0000	0.2306	0.0000	1,582	430,423
3	0.1253	0.0970	0.2121	0.0000	303	73,656
4	0.2947	0.0000	0.2521	0.0000	302	73,656
Δturnover						
1	...	...	...	...	...	...
2	...	...	...	...	...	...
3	0.2291	0.0010	0.1742	0.1010	211	54,332
4	0.4010	0.0220	0.1883	0.0120	211	54,332
Δprofits						
1	...	...	...	...	...	...
2	...	...	...	...	...	...
3	0.1263	0.6000	0.0209	0.9120	175	45,083
4	0.2987	0.1820	0.1519	0.4010	175	45,083
Δoverseas turnover						
1	...	...	...	...	...	...
2	...	...	...	...	...	...
3	-0.0901	0.6980	-0.0184	0.9460	54	4,462
4	0.1756	0.4760	0.0736	0.7740	54	4,462

Note: Standard errors have been obtained by bootstrapping. Assets are 'total assets'.

5. Conclusions

This report analyses the characteristics, survival and performance of firms that used the Passport scheme between April 2003 and Sept 2004. This is done by using a sample of 3,648 Passport firms that were matched to FAME December 2006 data. The FAME data contain information on around 2.6 million firms incorporated in 2004 or before. To the best of our knowledge, the data in FAME represents the entire population of registered UK firms at Companies House.

Of the 3,648 Passport firms we find that 3,164 are listed as 'active' by the FAME database in December 2006. We analysis the characteristics of these active firms in comparison with active firms listed in FAME. The main results are:

- Passport firms have higher total assets and turnover than FAME firms. Their return on assets is lower – at around 4% compared to 7% – although the distribution return on assets for Passport firms is more compact. Passport firms also tend to have higher liquidity ratios.

- The results show that Passport firms have larger overseas turnover (£3million versus £0.2 million for FAME), although only 10% of Passport firms contain this variable in FAME. However, looking at intensity (i.e. overseas turnover / turnover), Passport firms are lower with a median of 12% compared to a FAME median of 21%.

We also analysed the 484 Passport firms that were no longer listed as 'active' by the FAME December 2006 database. The FAME data contains various categories of 'inactive' firms. The largest of these is 'dissolved', followed by 'live/non-trading' and 'liquidated'. If we treat any firm in these categories as 'failed', we find that Passport firms have a higher survival rate (the estimates imply around 4% higher). This result is based on controlling for a range of other firm characteristics, such as age, size and industry. However, if we treat only the 'liquidated' category as representing a firm that has failed to survive we find the reverse: Passport firms are around 1% more likely to fail.

Finally, the analysis also provided an evaluation of the impact of the Passport scheme using the available data in FAME. The method used was a propensity score matching estimator. This creates a 'control group' of similar firms to Passport from the FAME data. The analysis then compares the control group to firms that did use Passport. The results indicated:

- That Passport firms had higher total assets and turnover growth than similar firms in FAME. The estimates imply Passport firms assets grew by around 7% faster per year over the 2002 to 2005 period; turnover growth was 6% (or more) faster. Although we also analysed the growth of profits and overseas turnover the results found no significant differences in growth rates.

Appendix 1 Copy of research plan

RESEARCH PLAN

Previous research for UKTI has established a match between 3,754 PASSPORT companies and the FAME database (Feb 2006 edition). This represents a success rate of 74%. The PASSPORT companies participated in the scheme between April 2003 and Sept 2004.

Stage 1

The first part of the research is to analyse the charatacteristics of the firms that have participated in PASSPORT *relative* to similar companies. According to the variables listed in FAME, there are hundreds of potential variables. However, in practice many of the variables have missing values for the smallest firms. For example, for the PASSPORT companies only 78% of these have accounting data on total assets, which is the most common balance sheet variable. This said, this is greater than the figure for the entire FAME data (49%).

The characteristics that will be investigated are listed below. In each case the focus will be on whether the PASSPORT companies sample differs from the entire population. Since the numbers of companies in FAME is so large, it is also possible to analyse whether PASSPORT companies differ from their industry peer group.

Date of incorporation

Ownership structure

Region

Profitability

Liquidity

Overseas turnover

The relative performance of PASSPORT companies will then be assessed. The initial performance measure is simply 'survival'. The previous research has already found that 370 PASSPORT firms are listed as inactive, hence this exit rate needs to be compared with other FAME firms. The planned method of analysis will include both summary statistics and probit multivariate analysis. Additional performance measures include:

Total asset growth,

Turnover growth (including overseas where available) and

Profitability.

The analysis aims to compare PASSPORT companies to similar FAME companies. Again both summary statistics and multivariate regression analysis will be used.

Appendix 2

Incorporation year

Incorporation year	Non-passport	Passport	Total		Non-passport	Passport	Total
	number column percentage						
1980	149,557	359	149,916	1994	34,426	91	34,517
	8.96	11.35	8.97		2.06	2.88	2.06
1981	10,147	27	10,174	1995	40,825	127	40,952
	0.61	0.85	0.61		2.45	4.01	2.45
1982	13,107	33	13,140	1996	50,187	128	50,315
	0.79	1.04	0.79		3.01	4.05	3.01
1983	13,571	43	13,614	1997	64,184	153	64,337
	0.81	1.36	0.81		3.85	4.84	3.85
1984	14,525	35	14,560	1998	72,744	176	72,920
	0.87	1.11	0.87		4.36	5.56	4.36
1985	15,792	41	15,833	1999	85,597	214	85,811
	0.95	1.3	0.95		5.13	6.76	5.13
1986	18,994	45	19,039	2000	101,489	251	101,740
	1.14	1.42	1.14		6.08	7.93	6.08
1987	21,293	53	21,346	2001	110,856	290	111,146
	1.28	1.68	1.28		6.64	9.17	6.65
1988	22,534	62	22,596	2002	177,256	322	177,578
	1.35	1.96	1.35		10.62	10.18	10.62
1989	23,727	51	23,778	2003	276,955	281	277,236
	1.42	1.61	1.42		16.6	8.88	16.58
1990	23,199	55	23,254	2004	250,615	121	250,736
	1.39	1.74	1.39		15.02	3.82	15
1991	23,825	57	23,882	Total	1,668,832	3,164	1,671,996
	1.43	1.8	1.43		100	100	100
1992	25,027	73	25,100				
	1.5	2.31	1.5				
1993	28,400	76	28,476				
	1.7	2.4	1.7				

SIC (2003)	Description	FAME	Passport	Total
2800	Manufacture of fabricated metal products, ex. mach. and eq.	72	0	72
	Percentages	0.36	0	0.35
2810	Manufacture of structural metal products	15	0	15
		0.07	0	0.07
2811	Manufacture of metal structures and parts of structures	3358	22	3380
		16.6	13.58	16.58
2812	Manufacture of builders' carpentry and joinery of metal	181	1	182
		0.89	0.62	0.89
2821	Manufacture of tanks, reservoirs and containers of metal	127	3	130
		0.63	1.85	0.64
2822	Manufacture of central heating radiators and boilers	127	1	128
		0.63	0.62	0.63
2830	Manufacture of stream generators, exc. hot water boilers	15	0	15
		0.07	0	0.07
2840	Forging, pressing, stamping and roll forming of metal	124	0	124
		0.61	0	0.61
2850	Treatment and coating of metals; gen. mechanical engineering	9	0	9
		0.04	0	0.04
2851	Treatment and coating of metals	474	2	476
		2.34	1.23	2.33
2852	General mechanical engineering	8332	55	8387
		41.2	33.95	41.14
2860	Manufacture of cutlery, tools and general hardware	4	0	4
		0.02	0	0.02
2861	Manufacture of cutlery	51	2	53
		0.25	1.23	0.26
2862	Manufacture of tools	948	11	959
		4.69	6.79	4.7
2863	Manufacture of locks and hinges	105	0	105
		0.52	0	0.52
2870	Manufacture of other fabricated metal products	76	0	76
		0.38	0	0.37
2871	Manufacture of steel drums and similar containers	24	0	24
		0.12	0	0.12
2872	Manufacture of light metal packaging	95	0	95
		0.47	0	0.47
2873	Manufacture of wire products	276	2	278
		1.36	1.23	1.36
2874	Manufacture of fasteners, screw machine products, chains and	389	6	395
		1.92	3.7	1.94
2875	Manufacture of other fabricated metal products n.e.c.	5423	57	5480
		26.81	35.19	26.88
	Total	20225	162	20387
	Percentages	100	100	100

SIC (2003)	Description	FAME	Passport	Total
3600	Manufacture of furniture; manufacturing not elsewhere classifie	147	0	147
	Percentages	1	0	0.99
3610	Manufacture of furniture	208	0	208
		1.41	0	1.4
3611	Manufacture of chairs and seats	537	4	541
		3.64	2.52	3.63
3612	Manufacture of other office and shop furniture	583	3	586
		3.96	1.89	3.93
3613	Manufacture of other kitchen furniture	504	1	505
		3.42	0.63	3.39
3614	Manufacture of other furniture	1751	15	1766
		11.88	9.43	11.86
3615	Manufacture of mattresses	66	4	70
		0.45	2.52	0.47
3620	Manufacture of jewellery and related articles	50	0	50
		0.34	0	0.34
3621	Striking of coins	3	0	3
		0.02	0	0.02
3622	Manufacture of jewellery and related articles not elsewhere clas	927	3	930
		6.29	1.89	6.24
3630	Manufacture of musical instruments	143	3	146
		0.97	1.89	0.98
3640	Manufacture of sports goods	401	5	406
		2.72	3.14	2.73
3650	Manufacture of games and toys	412	7	419
		2.8	4.4	2.81
3661	Manufacture of imitation jewellery	36	1	37
		0.24	0.63	0.25
3662	Manufacture of brooms and brushes	62	2	64
		0.42	1.26	0.43
3663	Other manufacturing not elsewhere classified	8903	111	9014
		60.43	69.81	60.53
	Total	14733	159	14892
	Percentages	100	100	100

SIC (2003)	Description	FAME	Passport	Total
5100	Wholesale trade and commission trade, exc. cars	135	0	135
	and motorcycles	0.18	0	0.18
5110	Wholesale on a fee or contract basis	5	0	5
		0.01	0	0.01
5111	Agents involved in the sale of agricultural raw materials,	785	1	786
	live animals, textile	1.06	0.3	1.06
5112	Agents involved in the sale of fuels, ores, metals	643	0	643
	and industrial chemicals	0.87	0	0.87
5113	Agents involved in the sale of timber and building materials	2727	4	2731
		3.7	1.22	3.69
5114	Agents involved in the sale of machinery, industrial	3967	22	3989
	equipment, ships and aircraft	5.38	6.71	5.39
5115	Agents involved in the sale of furniture, household goods,	892	4	896
	hardware and ironmong	1.21	1.22	1.21
5116	Agents involved in the sale of textiles, clothing, footwear	1190	4	1194
	and leather goods	1.61	1.22	1.61
5117	Agents involved in the sale of food, beverages and tobacco	1215	2	1217
		1.65	0.61	1.64
5118	Agents specialising in the sale of particular products	3393	14	3407
		4.6	4.27	4.6
5119	Agents involved in the sale of a variety of goods	3307	9	3316
		4.49	2.74	4.48
5120	Wholesale of agricultural raw materials and live animals	11	0	11
		0.01	0	0.01
5121	Wholesale of grain, seeds and animal feed	344	0	344
		0.47	0	0.46
5122	Wholesale of flowers and plants	655	2	657
		0.89	0.61	0.89
5123	Wholesale of live animals	106	0	106
		0.14	0	0.14
5124	Wholesale of hides, skins and leather	153	2	155
		0.21	0.61	0.21
5125	Wholesale of unmanufactured tobacco	4	0	4
		0.01	0	0.01
5130	Wholesale of food, beverages and tobacco	85	0	85
		0.12	0	0.11
5131	Wholesale of fruit and vegetables	1458	0	1458
		1.98	0	1.97
5132	Wholesale of meat and meat products	2076	1	2077
		2.82	0.3	2.8
5133	Wholesale of dairy produce, eggs and edible oils and fats	355	1	356
		0.48	0.3	0.48
5134	Wholesale of alcoholic and other beverages	2098	12	2110
		2.85	3.66	2.85
5135	Wholesale of tobacco products	60	0	60
		0.08	0	0.08
5136	Wholesale of sugar and chocolate and sugar confectionery	156	1	157
		0.21	0.3	0.21
5137	Wholesale of coffee, tea, cocoa and spices	314	1	315
		0.43	0.3	0.43
5138	Wholesale of other food including fish, crustaceans and molluscs	1268	5	1273
		1.72	1.52	1.72
5139	Non-specialised wholesale of food , beverages and tobacco	2078	15	2093

		2.82	4.57	2.83
5140	Wholesale of household goods	19	0	19
		0.03	0	0.03
5141	Wholesale of textiles	1938	10	1948
		2.63	3.05	2.63
5142	Wholesale of clothing and footwear	3798	29	3827
		5.15	8.84	5.17
5143	Wholesale of electrical household appliances and radio	2509	8	2517
	and television goods	3.4	2.44	3.4
5144	Wholesale of china and glassware, wallpaper and cleaning materials	554	1	555
		0.75	0.3	0.75
5145	Wholesale of perfume and cosmetics	530	7	537
		0.72	2.13	0.73
5146	Wholesale of pharmaceutical goods	1290	12	1302
		1.75	3.66	1.76
5147	Wholesale of other household goods	2638	11	2649
		3.58	3.35	3.58
5150	Wholesale of non-agricultural intermediate products,	2	0	2
	waste and scrap	0	0	0
5151	Wholesale of solid, liquid and gaseous fuels and related products	897	2	899
		1.22	0.61	1.21
5152	Wholesale of metals and metal ores	768	3	771
		1.04	0.91	1.04
5153	Wholesale of wood, construction materials and sanitary equipment	1197	2	1199
		1.62	0.61	1.62
5154	Wholesale of hardware, plumbing and heating equipment and supplies	1220	3	1223
		1.65	0.91	1.65
5155	Wholesale of chemical products	917	9	926
		1.24	2.74	1.25
5156	Wholesale of other intermediate products	1201	6	1207
		1.63	1.83	1.63
5157	Wholesale of waste and scrap	601	3	604
		0.82	0.91	0.82
5180	Wholesale of machinery, equipment and supplies	97	0	97
		0.13	0	0.13
5181	Wholesale of machine tools	462	2	464
		0.63	0.61	0.63
5182	Wholesale of mining, construction and civil engineering machinery	259	0	259
		0.35	0	0.35
5183	Wholesale of machinery for the textile industry, and	77	0	77
	of sewing and knitting mach	0.1	0	0.1
5184	Wholesale of computers, computer peripheral equipment	1207	2	1209
	and software	1.64	0.61	1.63
5185	Wholesale of other office machinery and equipment	392	1	393
		0.53	0.3	0.53
5186	Wholesale of other electronic parts and equipment	781	5	786
		1.06	1.52	1.06
5187	Wholesale of other machinery for use in industry,	956	4	960
	trade and navigation	1.3	1.22	1.3
5188	Wholesale of agricultural machinery and accessories	415	1	416
		0.56	0.3	0.56
5190	Other wholesale	19529	107	19636
		26.49	32.62	26.51
	Total	73734	328	74062

SIC (2003)	Description	FAME	Passport	Total
7200	Computer and related activities	4652	0	4652
		4.29	0	4.28
7210	Hardware consultancy	6926	13	6939
		6.39	4.42	6.39
7221	Software publishing	17104	83	17187
		15.78	28.23	15.82
7222	Other software consultancy and supply	30337	76	30413
		28	25.85	27.99
7230	Data processing	1136	4	1140
		1.05	1.36	1.05
7240	Data base activities	2475	7	2482
		2.28	2.38	2.28
7250	Maintenance and repair of office, accounting and computi	1698	1	1699
		1.57	0.34	1.56
7260	Other computer related activities	44031	110	44141
		40.63	37.41	40.63
	Total	108359	294	108653
	Percentages	100	100	100

SIC (2003)	Description	FAME	Passport	Total
7400	Other business activities	3893	0	3893
		0.83	0	0.83
7411	Legal activities	4364	0	4364
		0.93	0	0.92
7412	Accounting, book-keeping and auditing activities; tax cons	18947	3	18950
		4.02	0.46	4.02
7413	Market research and public opinion polling	2580	8	2588
		0.55	1.23	0.55
7414	Business and management consultancy activities	69674	125	69799
		14.79	19.26	14.79
7415	Holding companies including head Offices	28564	18	28582
		6.06	2.77	6.06
7420	Architectural and engineering activities and related technic	19553	32	19585
		4.15	4.93	4.15
7430	Technical testing and analysis	2701	18	2719
		0.57	2.77	0.58
7440	Advertising	8873	13	8886
		1.88	2	1.88
7450	Labour recruitment and provision of personnel	11714	8	11722
		2.49	1.23	2.48
7460	Investigation and security activities	2923	4	2927
		0.62	0.62	0.62
7470	Other cleaning services	6046	4	6050
		1.28	0.62	1.28
7480	Miscellaneous business activities not elsewhere classified	1	0	1
		0	0	0
7481	Photographic activities	3633	9	3642
		0.77	1.39	0.77
7482	Packaging activities	1191	4	1195
		0.25	0.62	0.25
7485	Secretarial and translation activities	1580	1	1581
		0.34	0.15	0.34
7486	Call centre activities	396	0	396
		0.08	0	0.08
7487	Other business activities not elsewhere classified	284538	402	284940
		60.39	61.94	60.39
	Total	471171	649	471820
	Percentages	100	100	100

Passport firms with greater than £10million total assets Company name	Incorporated	Total assets
CAPITA BUSINESS SERVICES LTD	26/09/1988	675,844
UNITECH LIMITED	05/01/1977	583,823
THE TETLEY GROUP LIMITED	09/01/1995	514,337
CSC UK LIMITED	24/04/2001	377,615
ASD LIMITED	25/05/1978	121,809
SWINDON PRESSINGS LIMITED	14/03/2000	115,935
DEANS FOODS LIMITED	22/09/1998	81,655
PREMIER MARINAS LIMITED	06/10/1994	64,578
HOZELOCK LIMITED	23/12/1959	59,206
ARRI (GB) LIMITED	23/12/1982	48,144
BUILDING ADHESIVES LIMITED	30/11/1962	36,647
ADNAMS PLC	24/03/1890	32,133
CURRENCIES DIRECT LIMITED	03/04/1995	30,975
JAYCARE LIMITED	31/03/1960	28,887
WILKINSON SWORD LIMITED	08/07/1889	27,607
BACO CONSUMER PRODUCTS LIMITED	17/02/1997	21,921
N & C BUILDING PRODUCTS LIMITED	30/09/1856	19,670
PWS DISTRIBUTORS LIMITED	27/01/1988	19,473
TURNING POINT	27/02/1964	17,575
PARITY SOLUTIONS LIMITED	06/01/1970	16,979
JOHN MILLS LIMITED	21/05/1986	16,749
NUMARK LIMITED	05/08/2002	16,371
CHARLES TYRWHITT LLP	28/10/2003	16,192
VICTORIA CARPETS LIMITED	22/07/1974	16,088
BEDE SCIENTIFIC INSTRUMENTS LIMITED	06/09/1978	15,891
LAYBOND PRODUCTS LIMITED	02/04/1903	15,837
SEPURA LIMITED	16/01/2002	15,643
JOINT REPLACEMENT INSTRUMENTATION LIMITED	06/04/1970	15,262
HEWLAND ENGINEERING LIMITED	29/05/1957	14,955
RUSSELL FINEX LIMITED	29/11/1934	14,923
A & S METALLURGICAL RESOURCES LIMITED	01/09/1993	14,718
D.D.D. LIMITED	16/05/1912	14,712
THE ROYAL CROWN DERBY PORCELAIN COMPANY LIMITED	27/04/2000	14,565
EWA LIMITED	02/10/1995	14,383
STAINTON METAL COMPANY LIMITED	03/08/2001	14,283
BOOKING.COM LIMITED	18/02/1998	13,864
CAMERONS BREWERY LIMITED	27/05/1998	13,695
CHEVLER PACKAGING LTD	21/04/1950	12,923
THE NATIONAL FOOTBALL MUSEUM	16/06/1995	12,886
TSC FOODS LIMITED	08/05/1990	12,863
PURICORE INTERNATIONAL LIMITED	10/03/1992	12,828
CORDEK LIMITED	27/11/1973	12,664
MORGAN MOTOR COMPANY LIMITED	29/01/1970	12,623
TOLLIT & HARVEY,LIMITED	18/10/1911	12,450
BECK GROUP LIMITED	19/12/2003	12,237
MILLER UK LIMITED	28/12/1987	12,131
METAL SPINNERS GROUP LIMITED	26/10/1955	11,708
PARKHAM FARMS LIMITED	02/03/1988	11,450
KOLAK SNACK FOODS LIMITED	19/03/1984	11,322
TRENDSETTER HOME FURNISHINGS LIMITED	15/02/1977	11,125
COBRA BEER LIMITED	06/03/1989	11,050
COOPER & TURNER LIMITED	26/06/2000	10,966
EFFEM EQUINE LTD	10/07/1998	10,821
LINCAT LIMITED	08/10/1987	10,670
ELECTROVISION LIMITED	25/09/1980	10,602
ZOO DIGITAL GROUP PLC	14/10/1999	10,568
ABRU LIMITED	19/09/1968	10,537
PRIDE VALLEY FOODS LIMITED	23/04/1992	10,362
THE SUPERCOVER GROUP LIMITED	04/12/1986	10,288
STANLEY GIBBONS LIMITED	04/01/1939	10,210
STOKES FORGINGS LIMITED	10/06/1939	10,193

Appendix 3

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Interim report on matching 'Passport' to FAME

3rd May 2006

Summary

The project was to investigate the possibility of matching UKTI datasets to FAME company data. Initially, the idea was to only look at SMEs from FAME (around 700k firms have employees between 1 and 250), however, the project has been extended to look at all 2.2 million companies from FAME.

This report provides a summary of the results of matching the 'Passport' UKTI database (provided by Gian Fazio) to FAME. The Passport file has 5,089 unique firm names. These data were firms that had participated in the scheme between April 2003 and Sept 2004.

The match to FAME yielded 3,384 common firms (or 66%).

Methodology

The FAME data come from the Feb 2006 DVD and contains 2.2 million companies. These data are downloaded to ASCII file with *famename* and *regno* (registered number) as key variables.

Famename is cleaned/standardized to give consistent punctuation and spelling of common words (e.g. all 'limited' are set to 'ltd').

The FAME data also contain information on changes in company names. All companies that had changed their name in 2001 or after were extracted and then a file with *oldfamename* was created. *Oldfamename* was

cleaned/standardized.

The passport data were supplied by Gian Fazio and the raw data file contained 5308 company names. There were 219 duplicate names in this file. These were dropped, leaving 5,089 unique company names. Again, these names were cleaned/standardized in exactly the same way as the FAME data created *passportname*.

The two sets of firm names were then matched using STATA v8.0 software. The method used can be summarized as follows:

- The standardized *famename* and *passportname* were matched on an exact basis (i.e. only if each string was exactly the same was a 'match' registered). This yielded 2068 matches.
- *Famename* and *passportname* were stripped of the word 'ltd' and then an exact match performed. This was done since many firms in Passport do not have 'ltd' in the name. This yielded 922 matches.
- A new variable called *namepost* was created from both FAME and Passport data. This consisted of the first seven characters of the name and the first three characters of the postcode. The two *namepost*'s created were then matched. This yielded a large number of potential matches (2454), although many of these were erroneous (since this method created many common *namepost*'s, for example *Oxford OX1*). A visual check of these yielded 295 matches. Some of these 'matches' involve a judgement over whether the companies are, in fact, the same. Two examples are show below. In both these cases these are identified as a match. However, given the possibility of error, any subsequent econometric analysis should check the findings with these firms excluded.
-

Famename	*Passportname*	*famepost*	*passportpost*
merlin precision engineers ltd	Merlin Precision Engineering Ltd	HX3 6DW	HX3 6DW
senstronics group ltd	Senstronics Ltd	DL5 6BG	DL5 6BG

- The above matching process was then repeated using *oldfamename*. Yielding a further 99 matches.

The overall number of matches was 3384 with a breakdown of sources as follows.

Source of match	Code in 'Match' variable	Number
Exact match, famename	Ec	2068
No 'ltd' match, famename	Lc	922
namepost match, famename	Pc	295
Exact match, famename	Eo	62
No 'ltd' match, famename	Lo	33
namepost match, famename	Po	4

The EXCEL file *Passport_FAME_match_Rogers_April2006.xls* contains full details of all these matches.

Discussion

As mentioned above, there may be some erroneous matches when *namepost* has been used due to subjective judgements on possible matches. Removing all these matches reduces the match rate to 61% and it would be sensible to check any subsequent analysis was not sensitive to these.

There are still 1705 companies (34%) that are not matched to FAME. Assuming that FAME does represent near universal coverage of registered companies in the UK the reasons for this could include: mis-spellings and data entry errors (in either data set not picked up by *namepost* match); companies using passport that are not, and did not become, registered under the name entered on passport. If the latter category is a major reason, it appears important to investigate this further (since their absence from any subsequent analysis could bias results). In any event, I would be interested to have UKTI's comments on this and other issues.

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Matching UKTI Passport and FAME: a review of data availability

13th September 2006

Summary

This paper investigates the availability of data in a matched data set of FAME and Passport. This is a necessary step in assessing the viability of policy evaluation for the UKTI Passport program using FAME data.

The initial aspect of this project was to match Passport names to FAME names. This was done in a previous project (Mark Rogers, May 2006), although this process was updated for this project (specifically 'inactive' companies from FAME (Feb 2006 DVD) were now also matched to Passport).

In summary there are 3,754 Passport companies that have been matched to FAME data (a match rate of 74%).

The purpose of this project is to analyse the data availability for these 3,754

companies in the FAME data set.

At the outset it is important to state that the Passport data were for companies that had participated in the scheme between April 2003 and Sept 2004 (supplied by Gian Fazio, April 2006). Similarly the FAME Feb 2006 data only has full year accounts up to and including 2004 (given the in-built regulatory delays in reporting accounts, see below). This means that the data collated here cannot be used directly for program evaluation at this time, although it would be straightforward to update the FAME financial accounts in the future.

Matching Methodology

The full description of the matching process is contained in Mark Rogers (May 2006, report to UKTI). In short, the FAME Feb 2006 DVD contains 2.2 million 'active' limited companies and 0.9 million 'inactive' limited companies. The Passport data file contained 5,089 unique *recordid*'s (see Note 1 for further discussion of this).

The number of matches with FAME was 3,754 (74%), with 370 of these companies being classified as inactive in the FAME data for Feb 2006. Table 1 shows the reasons for inactivity as recorded in FAME (Feb. 2006).

Table 1 Inactive companies

Recorded reason for 'inactive'	Number	Percentage (%)
Dissolved	138	37
Liquidation	119	32
Live/Non-trading	83	22
Receivership	30	8

FAME also contains data on the ownership of the companies. Specifically, the data indicates whether there is an ultimate holding company. Of the 3,754 companies, 561 companies have an ultimate holding company.

The FAME data also contains a wide range of other variables that indicate the nature and structure of the company in 2006, including: location, year of incorporation, industry or industries of activity, credit worthiness and number of directors.

Table 2 shows the year of incorporation as recorded in FAME. As can be seen, some companies show years after the Passport data supplied. This could be due to the use of names and postcodes to match some companies, rather than the full registered name. Equally, there could be other inaccuracies in the data that need to be investigated.

Table 2 Date of incorporation

Incorporation year	Number	Percentage (%)
Pre-2000	2,175	58
2000	312	8
2001	352	9
2002	378	10
2003	323	9
2004	144	4
2005	63	1
2006	7	0

Financial data

Background

It is important to understand the regulatory delays involved in accounting data being available to Companies House (and databases like FAME) (see Appendix Note 2). Because of these delays – and the fact that the Passport data come from April 2003 and Sept 2004 – it is difficult to know exactly what proportion of the 3754 companies *should* have data in FAME.

For an existing private limited company, Companies House requires it to file accounts within 10 months of the end of their accounting reference period (ARD). In standard cases a company's ARD is the same as the original date of registration; however, companies can change their ARD by up to 6 months.

A newly established private limited company must file its first set of accounts within 22 months of date of incorporation. Hence, a company set up in Sept 2004, would not have to report to Companies House until July 2006. Such a company would not have data in Companies House or FAME.

A second important issue is that the extent of accounting data that needs to be reported varies with the company size. A small company need only supply an abbreviated balance sheet to Companies House, which will contain only certain asset and liabilities data. A small company is defined as one that meets two of these criteria: turnover less than £5.6m; assets less than £2.8m; or less than 50 employees. (Before March 2004 the definition of 'small' was half the turnover and assets figure).

Given this exemption to small companies, any analysis that looks at turnover, profits or value added or similar variables is likely to exclude small companies.

Data availability

These represent three of main variables used in analysis of company performance. The table below looks at the coverage for these three variables over the period 2002 to 2004. (Note that 2005 data are not present in the FAME Feb. 2006 release; pre-2002 data are available in many cases, but they have been excluded here).

Table 3 Profit, turnover and assets data

Year	Profit (before interest)	Turnover	Total assets
2002	950	750	2855
2003	1003	806	3105
2004	798	672	2829
Average coverage in three years	24	20	78
(as % out of n = 3754)			

The table shows that asset data are much more prevalent that profit and loss sheet data, reflecting the reporting requirements set by Companies House. If we analyse how many companies in 2004 had total assets less than £2.8m – the threshold figure used by Companies House – we find a figure of 90%. This suggests that too many companies are reporting profit and turnover data; however, assets is only one of the three criteria (and there are other criteria if the company is owned by a larger group).

Table 4 shows coverage for other balance sheet data. As can be seen, these variables have similar coverage to total assets, indicating that one can construct

common measures of performance such as the liquidity ratio and growth in shareholders' funds for a majority of companies.

Table 4 Other balance sheet data

Year	Current assets	Current liabilities	Shareholders' funds
2002	2842	2682	2861
2003	3089	2950	3112
2004	2819	2690	2843
Maximal number n = 3754			

Other 'profit and loss' account data have, as to be expected, coverage similar or worse to the profit data show above (since there is no requirement for small companies to report such information). As an indication, Table 5 shows data coverage for UK turnover, gross profits and interest payments.

Table 5 Other 'profit and loss' account data

Year	Gross profit	UK turnover	Interest paid
2002	841	349	650
2003	903	361	696
2004	710	290	544
Maximal number n = 3754			

Conclusion

The paper has shown how data coverage from FAME is around 78% for assets data, but around 20% or less for turnover and profit data. Clearly, these levels of coverage indicate that care must be taken in any subsequent analysis.

Although this paper is not required to comment on how any subsequent

analysis could be carried out on such data, here are some provisional thoughts. These are only intended to be used in internal UKTI discussions.

a) Almost all data sets contain some form of missing data hence there is no reason to dismiss FAME-Passport data *a priori*.

b) It is important to note that some analysis of the role of Passport need not require financial data *per se*. The FAME data does contain basic data on industry, location, directors, shareholders and ownership, and these can be analysed in relation to propensity to use Passport.

c) A specific example may be an analysis of whether Passport alters the probability that a company becomes 'inactive' (or one of the sub-categories within 'inactive'). Economists would normally call this exit analysis. Similarly, one can analyse whether Passport companies are more or less likely to become 'large', with 'large' defined in various ways, including whether they report turnover data.

d) If one does use financial data, a key issue is whether firms that have FAME data are significantly different from those that do not, and whether this would bias the results from any analysis. Since some data differences are clearly driven by company size, it seems likely that this will be the case. However, this does not preclude undertaking analysis controlling for company size.

e) For example, a basic solution to such data issues is to constrain the analysis to larger companies that do have full financial data. The downside is that any subsequent results need to have a caveat such as "For larger companies that used Passport, the results suggest that ….".

f) As indicated in e), it is possible to analyse whether Passport makes a difference to companies export performance (i.e. difference between turnover and UK turnover), but this must take into account that only larger firms report such data.

g) Analysing asset-based data for smaller companies – such as growth in total assets or growth in shareholders' funds – may prove to be insightful. Once again, the analysis needs to check whether the use of Passport is correlated with the availability of data to minimize misleading results.

h) Finally, the above comments are related to traditional statistical methods (such as ordinary least squares or probit analysis). More recently, policy evaluation has made use of 'matching procedures'. This is where a firm which has had some policy intervention is matched as closely as possible with a firm that has not. In effect, these methods try to reconstruct a 'control group'. Given the very large size of the FAME data base these types of methods would appear to be entirely feasible.

Appendix Notes

Note 1: Passport data file consistency

Although this was not the focus of this project, it became clear that the Passport data file did have a number of inconsistencies. Removal of duplicate names and *recordid*'s was relatively straightforward. However, some inconsistencies also surfaced in the matching process. Some examples of these are shown below. An estimate of the numbers of these is about 100. These 'duplicates' were removed in the final 3754 matches, but are included in the 5089 Passport records stated in the main text. This suggests the actual matching rate is slightly higher than the 74% indicated in the text.

PASSPORT name	recordid
Multichem Ltd	3196
Multichem	3189
Judith Paul Fashions	5090
Judith Paul Fashions Ltd	380
Majorlift Hydraulics Equipment Ltd	3997
Majorlift Hydraulic Equipment Ltd	2945
Security Print Solutions Ltd	329
Security Print Solutions	3669
Data Harvest Group Ltd	4688
Data Haravest Group Ltd	5390

Note 2: Companies House reporting rules

The information in the text regarding reporting rules come from Companies House *Accounts and Accounting Reference Dates* July 2005 available on Companies House web-site (http://www.companies-house.gov.uk/about/gbhtml/gba3.shtml). There are additional details concerning reporting rules that have not been highlighted above.