

B ICT and other variables from Business Longitudinal Survey

Table B.1 of this appendix lists ICT use variables measured in the BLS-based data base used in this study.

Table B.1 **ICT variables**

| <i>Mnemonic</i> | <i>Name</i> | <i>Range</i> | <i>Definition</i> |
|-----------------|-------------------------------------|--------------|---|
| COMBUS | ICT use | [0,1] | 1 if firm uses computers, zero otherwise (imputed using 1996-97, 1997-98 data) |
| COMDUM1 | Recent take up of computers | [0,1] | 1 if firm used computers < 2 years, zero otherwise (imputed using 1996-97, 1997-98 data) |
| COMDUM2 | Recent/Medium-term user | [0,1] | 1 if firm used computers 2 to <5 years, zero otherwise (imputed using 1996-97 data) |
| COMDUM3 | Medium-term computer user | [0,1] | 1 if firm used computers 2 to <5 years, zero otherwise (imputed using 1996-97, 1997-98 data) |
| COMDUM4 | Longer-term computer user | [0,1] | 1 if firm used computers 5 or more years, zero otherwise (imputed using 1996-97, 1997-98 data) |
| _ELSM | Used electronic stock management | [0,1] | 1 if firm used computers & used this facility in 1996-97, zero otherwise |
| _ELEOP | Used electronic ordering/purchasing | [0,1] | as above |
| _ELEFT | Used electronic financial transfers | [0,1] | as above |
| ELEOTH | Other computer facilities | [0,1] | 1 if firm uses computers and reports zero against preceding items, zero other wise |
| CINTORD | Intensity of computer use | [0-3] | 0 not computer user 1 firm used single facility in 1996-97 2 firm used 2 facilities in 1996-97 3 firm used 3 facilities in 1996-97 |
| _COMLON | Length of computer use | [0-3] | 0 not computer user in 1996-97 1 used computers < 2 years in 1996-97 2 used computers 2 to <5 years in 1996-97 3 used computers 5 or more years in 1996-97 |
| _NETACC | Internet access | [0,1] | 1 if firm has Internet access, zero otherwise (imputed using 1996-97, 1997-98 data) |

Source: Analysis of BLS data in ABS (*Business Longitudinal Survey, Confidentialised Unit Record File, 1994-95 to 1997-98, Cat. no. 8141.0.30.001*).

Table B.2 lists other variables used in the regression analyses in chapters 3 and 4. The variables are groups according to firm characteristic groups in table 3.1. There are around 50 BLS-based variables referred to in the analyses. To make the analyses tractable and to avoid problems of multicollinearity, the number of items included in the regression analyses was substantially reduced from the possible maximum. The guidelines referred to in specifying the models reported in chapter 3 are set out below. The guidelines for specifying the growth modals reported in chapter 4 are outlined in appendix C.

Choice of explanatory variables in characteristics of firms using ICTs models

Explanatory variables were chosen from the above list using the following guidelines:

- items subject to specific comment in the literature (eg firm employment size, firm age) were included;
- at least one item from each group of variables was included. If items within a group cover different themes, each theme was represented in the model (eg the items relating to union membership and type of legal organisation in the group ‘organisational and management conditions’ are both included);
- summary indexes were used in place of individual variables (eg the model includes an index of intensity of business restructuring (*_busrest*) formed from 11 component variables). In future work, it may be practicable to decompose such summary indexes to highlight the significance of individual components or groups of components;
- indexes of organisational characteristics were included to reflect firm responses in a particular year (eg whether a firm restructured in a particular year as reflected by *_busrest*) and to reflect a ‘typical’ characteristic (whether they restructured in any year of the survey as reflected by *restd1*);
- possible summary items from a group were selected on the basis of statistical significance and impact of the variables inclusion/exclusion on the predictive power of the model; and
- period dummies were included according to the coverage of the model (eg the model on computer use included data pooled across the years 1994-95 to 1997-98 and hence included time dummies representing the last 3 years (with 1994-95 being the reference case)).

This selection process resulted in the inclusion of nearly 20 variables in each model, with some variation due to the inclusion of time dummies depending on the time coverage of the model.

While reflecting the characteristics of firms using ICTs, the models applied in chapter 3 are not predictive in the sense that they do not suggest conditions that may lead a firm to take up ICT. This feature reflects the use of historical data from the BLS for the analysis that observes the condition of firms with ICTs in particular reference years rather than the conditions of a planning process leading to the adoption of the new technology.²⁹ Secondly, because data screening processes undertaken to create the model-estimation data bases from the full BLS data sets (unintentionally) tended to favour the inclusion of firms using computers by 1994-95 (the first year of the BLS), the scope for testing the explanatory power of the binary choice models was limited. Nevertheless, where model testing was possible (particularly in the regression on Internet access), the explanatory power of the models proved to be quite good.

²⁹ In this sense, the current study differs from the study by Hollenstein: Determinants of the Adoption of Information and Communication Technologies, an Empirical Analysis Based on Firm-level Data for the Swiss Business Sector (2002), which investigates the decision of firms to adopt ICTs.

Table B.2 **Other variables**

| <i>Mnemonic</i> | <i>Name</i> | <i>Range</i> | <i>Definition</i> |
|--|--|--------------|--|
| Time dummies | | | |
| TDUM96 | Year dummy 1996 | [0,1] | 1 for year 1996 |
| TDUM97 | Year dummy 1997 | [0,1] | 1 for year 1997 |
| TDUM98 | Year dummy 1998 | [0,1] | 1 for year 1998 |
| Basic growth analysis variables | | | |
| _VADDED | Value added | Value | Total sales minus total expenses, plus opening stocks minus closing stocks |
| CAPSH | Capital share | Percent | Gross operating surplus divided by value added |
| LABSH | Labour share | Percent | Wages divided by value added |
| LABPROD (<i>y</i>) | Labour productivity | Value | Value added divided by total full time equivalent employment (<i>_TOTFTE</i>) |
| DLABPROD (<i>ẏ</i> or <i>ydot</i>) | Logarithmic change or growth rate of labour productivity | Value | Current period labour productivity divided by last years' labour productivity and expressed in logarithms |
| KINTENS (<i>k</i>) | Capital intensity | Value | Total assets divided by full time equivalent employment |
| DKINTENS (<i>k̇</i> or <i>kdot</i>) | Logarithmic change or growth rate of capital intensity | Value | Current period capital intensity divided by last years' capital intensity and expressed in logarithms |
| Absorptive capacity | | | |
| _TOTFTE | Total full time equivalent employment | Persons | Full time employment plus part time adjusted to a full time equivalent using a constant ratio of 0.43 derived from Australian labour force surveys |
| _BUSLOCS | Business locations | Number | |
| _AGE_A | Age of firm | [1-5] | <2 years old 2 to < 5 years old 5 to < 10 years old 10 to < 20 years old 20 or more years old |
| DAGE1 | Firms less than 5 years old in 1995 | [0,1] | 1 for firms less than 5 years old in 1995, zero otherwise |
| DAGE2 | Firms 5 or more years old in 1995 | [0,1] | 1 for firms 5 or more years old in 1995, zero otherwise |
| L1NEWBUS | New business | [0,1] | 1 for new firm; zero otherwise |
| Financial conditions | | | |
| EBITFTE | Earnings before interest and tax to value of fixed tangible assets | Ratio | Earnings measured as value added less labour income |
| DEBIT1 | Dummy - low profitability firms | [0,1] | 1 for firms with EBITFTE < 0.05, zero otherwise |
| DEBIT2 | Dummy – medium profitability firms | [0,1] | 1 for firms with EBITFTE < 0.05, zero otherwise |
| DEBIT3 | Dummy – higher profitability firms | [0,1] | 1 for firms with EBITFTE > 0.1, zero otherwise |

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Table B.2 (continued)

| <i>Mnemonic</i> | <i>Name</i> | <i>Range</i> | <i>Definition</i> |
|---|---|--------------|---|
| Human capital | | | |
| EDUCATN | Highest educational attainment achieved by major decision maker | [0-3] | 0 not applicable 1 school 2 trade 3 tertiary |
| TERTQUA | Tertiary qualifications of major decision maker in management, commerce or admin. | [0,1] | 1 for firms with major decision maker with specified tertiary qualifications, zero otherwise |
| WAGERATE | Average wage | Value | Wages divided by full time equivalent of persons employed and not adjusted for owner operator |
| Information and knowledge | | | |
| _BUSPRAC & L1BUSPRA | Index of intensity of use of six advanced business practices (ABP, see below) ^a and their one year lag | [0-1] | 0 no use of ABP to 1 use of six ABP |
| _BUSPBIN | Firm uses ABP | [0,1] | 1 if firm used any of the six items of ABP, zero otherwise |
| <i>Index (ABP) components (not separately included)</i> | | | |
| _BPFOR | Formal business planning | [0,1] | 1 if firm undertook formal planning, zero otherwise |
| _BPBUD | Budget forecasting | [0,1] | 1 if firm undertook budget forecasting, zero otherwise |
| _BPREG | Regular income and expenditure reports | [0,1] | 1 if firm undertook regular reporting, zero otherwise |
| _BPNET | Formal networking with other firms | [0,1] | 1 if firm undertook networking, zero otherwise |
| _BPCOM | Comparison of firm performance with other firms during financial year | [0,1] | 1 if firm made comparisons, zero otherwise |
| _BPEXP | Export marketing | [0,1] | 1 if firm undertook export marketing, zero otherwise |
| Organization and management conditions | | | |
| <i>Corporate structure</i> | | | |
| TOLO | Type of legal organisation | [0,1] | 1 for incorporated firms, zero otherwise |
| <i>Labour market & industrial relations</i> | | | |
| _UNIONME | Percentage of persons employed that were union members at 30 June | [1-6] | 1. no union role; 2. up to 10 percent coverage; 3. 11 to 25 percent coverage; 4. 26 to 50 percent coverage; 5. 51 to 75 percent coverage and 6. 76 to 100 percent coverage |
| _CONOUT | Contract out activities previously done by employees of the firm | [0,1] | 1 for firm who contract out activities, zero otherwise |

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Table B.2 (continued)

| <i>Mnemonic</i> | <i>Name</i> | <i>Range</i> | <i>Definition</i> |
|--|---|--------------|--|
| _ARRAWAR | Firm has an award form of employment arrangement during the last pay period in June | [0,1] | 1 for firm who has this type of arrangement, zero otherwise |
| _ARRCONT | Firm has an individual contract form of employment arrangement during the last pay period in June | [0,1] | 1 for firm who has this type of arrangement, zero otherwise |
| _ARRUNRE | Firm has an unregistered enterprise employment arrangement during the last pay period in June | [0,1] | 1 for firm who has this type of arrangement, zero otherwise |
| _ARRREG | Firm has a registered enterprise agreement during the last pay period in June | [0,1] | 1 for firm who has this type of arrangement, zero otherwise |
| Organizational and processing efficiency | | | |
| _BUSREST | Index of intensity of major change against eleven types of change (MJCS, see below). ^b | [0-1] | 0 no major change to 1 all 11 forms of major change |
| _BUSREBI & L1BUSRE | Firm made major changes in current and past years | [0,1] | 1 if firm made major change in any of the eleven items of _BUSREST, zero otherwise |
| RESTFREQ | Frequency of major change | [0-4] | 0 if no major change over 4 years 1 major change(s) in 1 year 2 major change(s) in 2 years 3 major change(s) in 3 years 4 major change(s) in each year |
| RESTD1 | Firms with major change in any year | [0,1] | 1 if major change in any year, zero otherwise |
| RESTD2 | Firms with major changes in any 2 years | [0,1] | 1 if major change in any 2 years, zero otherwise |
| RESTD3 | Firms with major changes in any 3 years | [0,1] | 1 if major change in any 3 years, zero otherwise |
| RESTD4 | Firms with major changes in each year | [0,1] | 1 if major change in each year, zero otherwise |
| <i>Index (MJCS) components (not separately included)</i> | | | |
| _MJCRANG | Range of products or services | [0,1] | 1 if major change occurred, zero otherwise |
| _MJCADVE | Advertising | [0,1] | Ditto |
| _MJCDIST | Distribution | [0,1] | Ditto |
| _MJCDOM | Domestic markets targeted | [0,1] | Ditto |
| _MJCEXP | Export markets targeted | [0,1] | Ditto |
| _MJCSOFT | Accounting software | [0,1] | Ditto |
| _MJCPROD | Production technology | [0,1] | Ditto |
| _MJCMGTT | Management training | [0,1] | Ditto |

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Table B.2 (continued)

| <i>Mnemonic</i> | <i>Name</i> | <i>Range</i> | <i>Definition</i> |
|---------------------------|---|--------------|--|
| _MJCTRN | Technical and on the job training | [0,1] | Ditto |
| _OMCBUST | Business structure | [0,1] | Ditto |
| _OMCOTHE | 'Other' business changes | [0,1] | Ditto |
| Product innovation | | | |
| _INNOVAT & L1INNOVA | Firm developed new or substantially changed products or services during current year or past year | [0,1] | 1 if firm made change, zero otherwise |
| INNOFREQ | Frequency of product change | [0,4] | 0 no product change 1 product change(s) in 1 year 2 product change(s) in 2 years 3 product change(s) in 3 years 4 product change(s) in each year |
| INNOD1 | Firms with new or substantially changed product in any year | [0,1] | 1 if major change in any year, zero otherwise |
| INNOD2 | Firms with changes in any 2 years | [0,1] | 1 if major change in any 2 years, zero otherwise |
| INNOD3 | Firms with changes in any 3 years | [0,1] | 1 if major change in any 3 years, zero otherwise |
| INNOD4 | Firms with changes in each year | [0,1] | 1 if major change in each year, zero otherwise |
| _RANDD | Performed or paid others to perform research & development | [0,1] | 1 if firm performed or paid to others, zero otherwise |
| Openness | | | |
| _EXPINT | Export intensity | Ratio | Ratio of value export sales to total value of sales |
| _EXPBI | Export status | [0,1] | 1 if firm exported, zero otherwise |
| Sample bias | | | |
| _WGHT_F | Cross sectional flow weight assigned by ABS reflecting sample design | Value | Probability of inverse selection of a firm in the sample |

a Defined as: $\sum_{n=1}^6 \left(\frac{ABP_{nj}}{6} \right)$ for each firm j . **b** Defined as: $\sum_{m=1}^{11} \left(\frac{MJCS_{mj}}{11} \right)$ for each firm j .

Source: Analysis of BLS data in ABS (Business Longitudinal Survey, Confidentialised Unit Record File, 1994-95 to 1997-98, Cat. no. 8141.0.30.001).