OECD Structural Business Statistics Meeting

For information: paper for the meeting of the Working Group on Business demography – Eurostat – 24-25 May 2007

MEETING OF THE WORKING GROUP

"Business Demography"

24-25 May 2007

Eurostat
Bech Building
5, rue Alphonse Weicker
L-2721 Luxembourg-Kirchberg
"Quetelet" room

Day 1 - 09.30 - 17.30
Day 2 - 09.30 - 12.30

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Joint OECD/Eurostat Manual on Business Demography

- Draft with "track changes" -

Chairperson: Axel Behrens
Interpretation requested from DE, EN and FR to DE, EN and FR

DRAFT

BUSINESS DEMOGRAPHY

RECOMMENDATIONS MANUAL

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Chapter 1
Introduction

1. Introduction

1.1 About this manual

This methodological manual aims to provide both practical and theoretical guidance to those involved in the production and use of data on business demography within the European Union. It has been developed from the methodological guidelines used for the business demography feasibility study and first harmonised data collection. It contains revisions to those guidelines based on the experiences gained during those exercises.

These guidelines have been discussed and agreed by the Business Demography Working Group. Hence, they are jointly agreed upon and should be considered as recommendations for practices that enable the production of comparable statistics.
This methodological manual is intended to be consistent with, and to complement methodological guidelines for other areas of business statistics, particularly those concerning statistical business registers and structural business statistics. As such, this manual forms part of the virtual, electronic Eurostat Manual of Business Statistics (see: http://forum.europa.eu.int/irc/dsis/bmethods/info/data/new/embs/embs_en.html). It is, however, also intended that this manual can be read as a free-standing document.

1.2 Aims and user needs

There are clearly growing demands for data on business demography from a wide range of users, both at European and OECD level. At the European level demands are for coherent and comparable data across the members of the European Statistical System. Key customers at this level are the economic policy makers within the European institutions, particularly Enterprise DG of the European Commission. The European Commission has assured its commitment to a policy that promotes entrepreneurship as an essential instrument for improving competitiveness and generating economic growth and job opportunities since its communication to the Council[1] on 'Promoting Entrepreneurship and Competitiveness'. Moreover, the 1999 Employment Guidelines adopted by the Council Resolution emphasise the development of entrepreneurship, given that the formation of new enterprises and the growth of small and medium-sized enterprises are essential for job creation.

The Council of Lisbon in the summer of 2000 set the strategic goal of transforming the European Union into 'the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion'. This strategic goal can be reached, among others, through the support of entrepreneurship and entrepreneurial dynamism, the presence of which can be revealed by the analysis of business demography over time. As a consequence, there is high demand for comparable data on business demography for the purposes of monitoring and policy formulation.

[1] COM (1998)550 final.

Customers at the national level also benefit from the development of harmonised methodologies and the exchange of good practices and experiences between countries.

The harmonised data collections aim to result in comparable data on business demography for current and future European Union (EU) and European Free Trade Association (EFTA) Member States. In particular they aim to satisfy the expected requirements for Structural Indicators[2] regarding births, deaths and survival.

At the level of the OECD the demand has been identified for data that are comparable also with countries outside the EU. This comparability is limited if self-employment is included as many non-EU OECD countries produce business demography data only on employer businesses. Indeed, in practice, thresholds for the inclusion of very small units vary between the EU Member States..

The OECD, Eurostat and the EU Member States have agreed that the collection of data on enterprises that have paid employment can significantly improve the comparability of birth and death rates among all OECD countries, and certainly for EU countries, comparability with other economic regions is of importance. While the data collection including non-employers is undisputed within the EU, this manual describes additional elements for business demography based only on employers, aiming at increased comparability at a more global level. Business demography data limited to employers only will be a fundamental and important element of the "Entrepreneurship Indicators" to be collected at OECD level.

The philosophy of the project to develop statistics on business demography has been to minimise the burden on enterprises and National Statistical Institutes and to use automation and existing tools as much as possible. The guidelines contained in this manual have been based on a pragmatic approach. This means that it should be possible to implement them in different countries with relatively little effort. With this aim in mind, the main source for demographic data should be the statistical business register. The advantages and constraints of this data source are explored further in Chapter 2.

1.3 Units and coverage

Statistical units

The statistical unit to be used for business demography data collections is the enterprise. This unit is defined as follows in the statistical units Regulation (Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community):

"The enterprise is the smallest combination of legal units that is an organisational unit producing goods or services, which benefits from a certain degree of autonomy

[2] The indicators provide an instrument for monitoring and benchmarking which are vital elements of the Lisbon follow-up strategy

in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit."

It is recognised that this unit may not yet be available in statistical business registers in all countries. The general understanding within this project is that demographic data can be produced starting from legal units, as the end result of the various checks to be performed will be sufficiently close to statistics on enterprise births and deaths. However, it is recommended to aim at introducing the concept of the enterprise in the statistical business registers.

Coverage of economic activities and legal forms

The economic activities for which business demography indicators are produced are the sections C to K and potentially M to O of NACE Rev.1.1, excluding class 74.15 (management activities of holding companies). Thus activities relating to production, construction, distributive trades and services are covered, but agriculture, public administration, non-market activities of households, and extra-territorial agencies are not. This is mainly due to the current coverage requirements of statistical business registers. NACE Rev 1.1 is valid for data from reference year 2003 onwards. Up to the year 2002, NACE Rev. 1 is the valid nomenclature.

At present indicators include market oriented legal forms (e.g. limited liability companies, sole proprietors, partnerships, and public corporations) but exclude units in the central and local government sectors. This is because the definition of the enterprise is not yet sufficiently developed for these sectors.

1.4 Legal Basis

The collection of basic data on business demography was foreseen in the structural business statistics Regulation (Council Regulation (EC, EURATOM) No 58/97 of 20 December 1996 concerning structural business statistics). Basic variables such as counts of enterprise births and deaths have already been defined in Commission Regulation (EC) No 2700/98 of 17 December 1998 concerning the definitions of characteristics for structural business statistics.

Annex IX of the recast Council Regulation on Structural Business Statistics (no. xxx/2007 of xx/xx/2007) provides the legal framework for the harmonised data collection at EU level.
This methodological manual itself has no direct legal basis, and therefore should be seen as advisory. It does, however, seek to interpret and explain current and possible future legal requirements and to give recommendations for practices that will make possible the establishment of harmonised statistics.

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Chapter 2
Data Sources

2. Data Sources

2.1 Business registers

The main source of data for data on business demography is the statistical business register. This source was chosen for various reasons including the following:

- Using data from statistical business registers is generally quicker and cheaper than conducting a survey.
- There is a considerable degree of harmonisation of statistical business registers in Member States following the adoption of the business registers Regulation (Council Regulation (EEC) No 2186/93 of 22 July 1993 on Community co-ordination in drawing up business registers for statistical purposes). This Regulation sets standards for coverage of activities, units and variables, thus helping to assure a certain level of data quality, particularly as regards comparability.
- Under this Regulation, Member States are required to hold data on the enterprise, a harmonised statistical unit that removes the impact of different legal and organisational infrastructures. Although the enterprise has not yet been fully implemented in all Member States, and issues relating to the delineation of complex enterprises are still under discussion, the use of this unit will ensure a further increase in the comparability of data.

Statistical business registers are themselves generally built from a number of different sources. The choice of sources is left to the Member States under the principle of subsidiarity, though the minimum standards set out in the Regulation must be complied with.

In practice, most national registers are based on a combination of administrative and statistical sources. The administrative sources generally include tax registers (e.g. for value added tax, corporation tax or income tax), compulsory registration systems (e.g. for limited liability businesses or those quoted on stock markets), social security sources and other public or private sector data holdings. The statistical sources generally comprise returns from various surveys.

The range of different sources used for a statistical business register means that duplication of units is a potential problem. Some countries have well developed systems and processes to deal with this, but others are still in the early stages of development in this area. This means that the matching routines described in chapter 5 are particularly important for ensuring comparable data.

The quality of statistical business registers in Member States and certain other countries is measured annually via a survey conducted by Eurostat. This survey also assesses the degree of compliance with the registers Regulation. As a result a time-series is being developed to show the rate of progress in the harmonisation of registers across the European Union. Taken together, this survey, and the provisions of the registers Regulation, help to ensure that the level of quality of statistical business registers as a source for data on business demography, is known and documented, and where possible, improved.

The development and use of statistical business registers in the European Union is the subject of a separate methodological manual, which also considers (in chapters 11-16) issues relating to business demography, and continuity of units. It is available from Eurostat, or can be accessed on the Internet at:

http://forum.europa.eu.int/irc/dsis/bmethods/info/data/new/embs/registers/embs1_5.html.

2.2 Other sources

Basic data from statistical business registers are supplemented by data from other survey and administrative sources for certain purposes, particularly the determination of births, deaths and enterprise continuity. Examples of such sources, and the purposes for which they are used in certain Member States are given in the following paragraphs.

- Tax sources – In the Netherlands various tax sources relating to e.g. VAT, profits and wages have been used to help determine the true population of active enterprises.

- Statistical surveys – An existing survey on the dissolution of enterprises is used in Portugal as an input to the matching process to determine deaths. Also in Portugal, the harmonised business survey is used to update turnover and persons employed, and provides a basis for estimating the number of employees. Surveys on labour and wages, and specific surveys on enterprise demography have been used in the Netherlands to help determine and validate the population of active enterprises.

- Clerical checking – This has been used to some extent in all participating countries to validate large births and deaths, and determine whether or not enterprises have survived. Clerical checks have also been used in some cases to investigate unusual or unexpected results. Sources used to aid clerical checking vary widely between countries, and include various administrative sources, direct contact (by mail or telephone) and the Internet.

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Chapter 3
The Population of Active Enterprises

3. The Population of Active Enterprises

3.1 Scope of this population

The population of active enterprises consists of all enterprises that had either turnover or employment at any time during the reference period. If there is insufficient information on turnover or employment to determine whether or not an enterprise is active, then national methods leading to this aim will be accepted.

In principle, this definition of the population of active enterprises is intrinsically linked to any thresholds that apply. So if the threshold, or target enterprises, is enterprises with 1 or more employees then the population should also be based on this threshold. The same principle follows for targets that track enterprises with zero or more employees, 2 or more employees and so on. The employment used as a threshold for these populations should be based on the annual average in head counts over the operating period of the enterprise (please refer to section 5.3 "Employment in newly born enterprises" for further explanations on measuring the number of employees). The operating period begins as soon as an enterprise fulfils the activity criterion. If for instance a former non-employer enterprise employs the first and only employee in the fourth quarter of a given year, the quarterly observations (0-0-0-1 employees) would indicate that the enterprise would be in population N, but – for the purposes of statistics on statistics on employer enterprises – also in population N_1. As a unit in population N, it would have 0 employees (0.25 on annual average rounded to 0), and as a unit in population N_1 it would have one employee (1 in the fourth quarter).

The following populations of active enterprises are distinguished, depending on the employee thresholds that are applied.

N	Population of active enterprises including all employers and non-employers
N_1	Population of active employer enterprises (at least one employee)
N_2	Population of active employer enterprises with at least two employees
N(0)	Population of active non-employer enterprises. This is the same as N – N_1.
N(0,1)	Population of active enterprises with no or one employee. This is the same as N – N_2.

Populations N_1 and N_2 will be the denominators for the employer and economic birth and death rates as shown in Chapter 5. Populations N(0) and N(0,1) will be needed for the methodology to identify these births and deaths.

This scope is restricted slightly in terms of economic activity and legal form as discussed in the following paragraphs, but, at least for EU Member States, it includes the vast majority of economically significant units.

The population of active enterprises for the purposes of calculating indicators excludes those enterprises classified to NACE Rev.1.1 sections A, B, L, P and Q, as well as those in class 74.15. These activities are excluded because they are not yet compulsory for statistical business registers or are not relevant for the purposes of business demography.

Similarly, enterprises with the legal forms of central or local government are excluded from this population. This is because there is no agreed interpretation of the enterprise definition for these legal forms, and most of them will be classified to NACE section L, which is already excluded as described above.

Data are required for this population for two main reasons:

- to provide the denominator for a wide range of indicators, and thus ensure a degree of comparability between countries with economies of different sizes
- to appreciate general trends in the patterns and relative contributions of different sectors of the economy over time.

3.2 Indicators

As well as providing the denominator for a range of indicators, the population of active enterprises can also be used to produce various useful indicators itself, particularly relating to the evolution of this population over time. Such indicators allow the trends in the population to be analysed, e.g. the extent and speed of the move to a service based economy, or the rate of growth of information and communication technology (ICT) activities.

It is clear that by using the population of enterprises active during a period, two effects may be observed, and may introduce an element of uncertainty. The first effect will be the genuine change in numbers of enterprises of a certain category over time. The second effect will be changes in patterns of births, deaths and survival in the same category of enterprise, i.e. if there are a relatively large number of births and deaths in a given period, the number of enterprises active during that period is likely to be higher than that for previous periods, but this may only reflect increasing volatility, not a genuine increase in the economic significance of this category. For this reason, it is recommended that indicators on the population of active enterprises are accompanied by indicators on births and deaths to aid their interpretation.

Studying the employment in this population may also allow a greater appreciation of the overall employment trends in a given country or activity. This would complement, and help to put into context, data on employment gained through enterprise births, or lost through enterprise deaths. Employment data are, however already available from a number of other sources, e.g. structural business statistics and the labour force survey. Additional data on employment from business demography may only increase confusion for users, therefore it is not proposed to produce employment indicators from the population of active enterprises at this point.

Similar arguments could be made regarding turnover. Again, for the same reasons as above, it is not currently proposed to produce indicators for the population of active enterprises using business demography data.

The proposed indicators on the population of active enterprises are therefore:

- The percentage change in the number of active enterprises between year xx-1 and year xx
- The percentage change in the number of active enterprises between year xx-5 and year xx

These indicators give both a relatively short-term view, and a more medium-term view of the evolution of the population of active enterprises, but it is recognised that it will not be possible to produce the second indicator until a sufficient series of back-data has been built up. It is also recognised that there is a danger that quality changes may have a significant impact when comparing data for two periods five years apart, therefore the second indicator should be regarded as provisional, and not necessarily for release, until data quality has been assured.

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Chapter 4
Typology of Demographic Events

4. Typology of Demographic Events

4.1 Typology

This chapter explores the relationships between the main demographic events affecting enterprises. It develops a typology of demographic events that describes these events and takes account of the links between them. This typology is then interpreted from the point of view of both business demography and statistical business registers.

Chapter 12 of the Business Registers Recommendations Manual sets out a general typology of demographic events covering a range of statistical units including the enterprise. These events are split into existential changes (i.e. those involving the emergence or disappearance of combinations of production factors) and distribution changes (i.e. changes in the distribution of production factors between units).

Chapters 13 and 14 develop this typology specifically for the enterprise, by considering the continuity of enterprises, and the number of enterprises present before and after a particular demographic event. In this way, existential changes (births and deaths) can be defined as events that involve the transition from no enterprises to one enterprise, or vice versa. Changes in the distribution of production factors, however, require that at least one enterprise is present both before and after the event.

This approach is summarised in the table below, which contains the main demographic events for which it is considered that there is demand for data:

Event	**Real, observable world**		**Business register**	
	Enterprises before the event	*Enterprises after the event*	*Creations*	*Deletions*
Enterprise birth	-	1	1	-
Enterprise death	1	-	-	1
Change of ownership	1	1	-	-
Merger	n	1	1	n
Take-over	n	1	-	n-1
Break-up	1	n	n	1
Split-off	1	n	n-1	-
Creation of a joint venture	n	n+1	1	-
Cessation of a joint venture	n	n-1	-	1
Restructuring within an enterprise	1	1	-	-
Restructuring within an enterprise group	n	n	0 or more	0 or more
Change of group	1	1	-	-

Complex restructuring	n	n	0 or more	0 or more

Note: n = 2 or more

This table does not cover separately employer or economic enterprise births or deaths, defined in Chapter 5, because these events do not necessarily have an effect on the units covered in the business register. Entries by growth (reaching the respective employee threshold) are events related to units that already exist in the business register. Equally, exits by decline (moving below an employee threshold) may lead to the removal of a unit from the business register only with a delay, if at all.

The continuity rules set out in chapter 14 of the Business Registers Recommendation Manual consider three continuity factors, continuity of control, economic activity and location. They can be summarised in the following way (read by column):

Change of controlling legal unit	No	Yes	No	No	Yes	No	Yes	Yes
Change of principal activity	No	No	No	Yes	No	Yes	Yes	Yes
Change of main location	No	No	Yes	No	Yes	Yes	No	Yes
Continuity of Enterprise?	**Yes**	**Yes**	**Yes**	**Yes**	See note	**No**	**No**	**No**

Note - these rules generally follow the approach that if two out of three of the continuity factors change, there is no continuity of the enterprise. There is, however, one exception. This is where an unincorporated business simultaneously moves to a new location and changes its legal form to become incorporated (and therefore limit liability). The convention is that there is continuity of the enterprise in such cases.

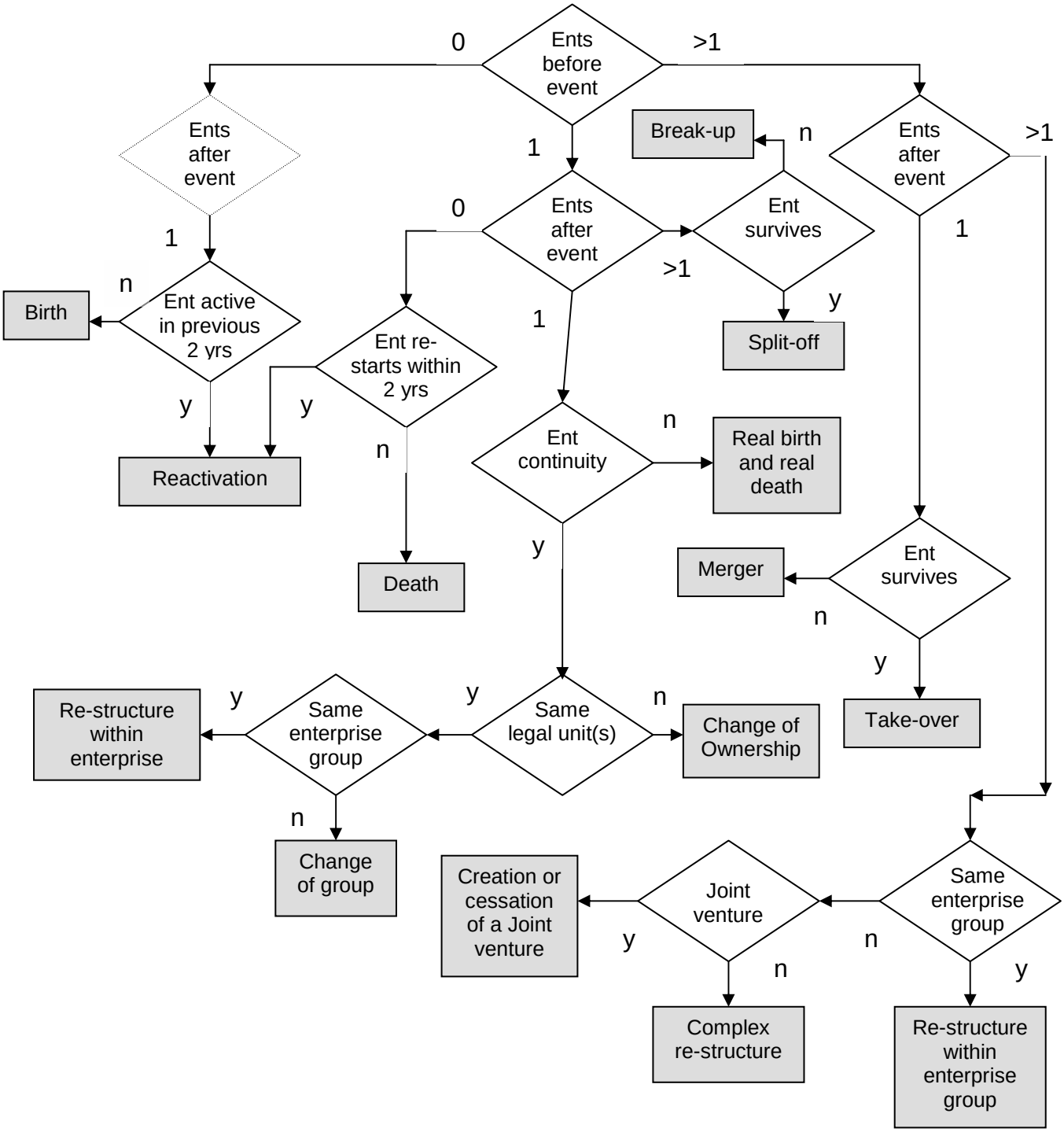
Continuity of employment may also be an important factor, particularly in the (relatively rare) cases where the above rules may lead to the conclusion that two separate enterprises are continuations of a single previous enterprise. Continuity of employment is, however, often difficult to measure in practice, particularly for smaller enterprises, hence it is excluded from the main rules above. It could also be argued that the more measurable factors of principal activity and location are in fact proxies for employment.

There are, however, certain events such as mergers, split-offs, take-overs and restructuring that are not fully covered by these rules. These events are considered further below. The approach followed here is to create a decision matrix that can be used to determine whether or not a particular event has happened, then to look in more detail at the possible outcomes.

Demographic Events Decision Matrix

The decision matrix below is designed to help determine the type of event that has taken place, by drawing together the typology and the continuity rules given above. The key events for business demography are births and deaths, though other events are relevant when determining whether or not an enterprise has survived.

Note : Ent = enterprise



The outcomes of the decision matrix above can be considered in terms of their implications for both business demography and statistical business registers. Entries by growth and exits by decline are not represented in the matrix above. These are not purely demographic events, but rather changes in enterprise size that lead to the adjustment of the birth and death populations that are delineated by employee thresholds.

- **Enterprise Birth** – This is an independent event affecting only one enterprise, and involving the creation of a new combination of factors of production. It meets the criteria for real births in the business demography methodology, and involves the creation of a new enterprise reference on the business register.

- **Entry by growth** – An entry by growth occurs if an enterprise was already active, but its employment was below the employee threshold for at least two years before the year when it reaches the employee threshold. This is an event that occurs only in the context of demographic data based on a threshold of one or two employees.

- **Employer Enterprise Birth** – An Employer Enterprise Birth occurs either as an enterprise birth with at least one employee in the year of birth, or as an entry by growth reaching the threshold of one employee.

- **Economic Enterprise Birth** – An Economic Enterprise Birth occurs either as an enterprise birth with at least two employees in the year of birth, or as an entry by growth reaching the threshold of two employees..

- **Reactivation** – This event involves an enterprise becoming dormant for a period of less than two years, then re-commencing activity in a way that complies with the definition of continuity. In terms of business demography this event does not constitute a birth or death. The enterprise is considered to have survived as long as the period of inactivity does not encompass a whole calendar year. On the business register, there would be continuity of the enterprise reference, but ideally, the enterprise should have a marker to show that it is dormant during the period of inactivity. If the definition of continuity is not met, e.g. an entrepreneur re-commences trading but with a different activity and at a different location, this would be considered as a death followed by a birth.

- **Enterprise Death** – This is an independent event affecting only one enterprise, and involving the dissolution of a combination of factors of production. It meets the criteria for real deaths in the business demography methodology, and involves the deletion of an enterprise reference on the (live) business register.

- **Exit by Decline –** An exit by decline occurs if an enterprise continues to be active, but moves below the employee threshold for at least two years. This is an event that occurs only in the context of demographic data based on a threshold of one or two employees.

- **Employer Enterprise Death –** An Employee Enterprise death occurs either as an enterprise death with at least one employee in the year of death or as an exit by decline, moving below the threshold of one employee..

- **Economic Enterprise Death –** An Economic Enterprise death occurs either as an enterprise death with at least two employees in the year of death or as an exit by decline, moving below the threshold of two employees..

- **Re-structure Within Enterprise** – This type of event only involves one enterprise, which survives throughout, but changes structure in the process. Examples include opening or closing local units. This event is of no real interest or significance from the point of view of business demography, and has no impact on the demographic variables held at the enterprise level on business registers

- **Break-up** – This event involves a splitting of the production factors of an enterprise into two or more new enterprises, in such a way that the previous enterprise is no longer recognisable. There is no continuity or survival, but the closure of the previous enterprise is not considered to be a death. Similarly the new enterprises are not considered to be births. In the business register, this event would be reflected by the deletion of an enterprise reference (from the live register), and the creation of two or more new enterprise references.

- **Split-off** – This event is similar to a break-up, but in this case the original enterprise does survive in a recognisable form, and therefore there is both continuity and survival. There is no death, but one or more new enterprises are created. This would be recorded in the business register by the creation of one or more new enterprise references.

- **Merger** - This event can be seen as the opposite of a break-up. It involves a consolidation of the production factors of two or more enterprises into one new enterprise, in such a way that the previous enterprises are no longer recognisable. There is no continuity or survival, but the closures of the previous enterprises are not considered to be deaths. Similarly the new enterprise is not considered to be a birth. In the business register, this event would be reflected by the deletion of two or more enterprise references, and the creation of one new enterprise reference.

- **Change of Ownership** (one-to-one take-over) - This event simply involves the re-structuring of the legal basis of an enterprise. Typically this would be a re-registration with the legal authorities, e.g. due to a change in the legal form of an enterprise. The enterprise remains live and active throughout. No other enterprises are involved. This event would have no impact on demographic variables at the enterprise level in the business register.

- **Take-over** - This event can be seen as the opposite of a split-off. Enterprises taken over are not considered to be deaths. In this case, one of the original enterprises does survive in a recognisable form, and therefore there is both continuity and survival. The remaining original enterprises are closed. This

would be recorded in the (live) business register by the deletion of one or more enterprise references.

- **Creation or Cessation of a Joint Venture** – A joint venture is created when two or more independent enterprises agree to commit some of their resources to work together on a common project or towards a common goal. An important feature of a joint venture is that none of the original enterprises exercise outright control over the entity created, therefore, it is considered to be an enterprise. For business demography purposes, joint ventures may be considered to be births if they involve the creation of new factors of production. This is recorded in the business register by the creation of a new enterprise reference.

  The cessation of a joint venture mirrors the above. It can be considered a death if less than half of the employment is transferred to the participating enterprises. It is recorded as the deletion of an enterprise reference from the (live) business register.

- **Re-structure Within Enterprise Group** – This event involves the creation and/or cessation of one or more enterprises under common ownership. It does not involve a significant change in the total production factors controlled by the group. It does not therefore result in any births or deaths, but will involve the creation and/or deletion of one or more enterprise references on the (live) business register.

- **Complex Re-structure** – This event is similar in principle to a re-structure within an enterprise group, but concerns two or more enterprise groups. There are many different scenarios, but a typical example is where two or more enterprise groups trade subsidiary enterprises. This does not involve a significant change in the total production factors within the economy, and does not, therefore result in any births or deaths. It may involve the creation and/or deletion of one or more enterprise references on the (live) business register.

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Chapter 5
Enterprise Births

5. Enterprise Births

Section 5.1 explains the suggested methodology for the identification of enterprise births. Enterprise births are studied in all statistics on business demography, regardless of any thresholds. They are the only birth events that are studied if no threshold in terms of the number of employees is set. In addition to enterprise births, employer enterprise births and economic enterprise births may occur in data collections using an employee threshold. These are explained in section 5.2 on employer enterprise births and economic enterprise births.

According to the use of employee thresholds, the following populations of newly born enterprises can be distinguished:

Enterprise births (population **R**): Enterprise births covering all enterprises, regardless of whether they are employers or not. No general threshold is applied to the size of the enterprise in terms of employment or any other characteristics.

Employer enterprise births (population $\mathbf{R_1}$): Births of enterprises with at least one employee. This population consists of enterprise births (population R) that have at least one employee in the birth year and of enterprises that existed before the year in consideration, but were below the threshold of one employee.

Economic enterprise births (population $\mathbf{R_2}$): Births of enterprises with at least two employees. This population consists of enterprise births (population R) that have at least two employees in the birth year and of enterprises that existed before the year in consideration, but were below the threshold of two employees.

Thus, the same unit may be recorded as an enterprise birth in more than one of these populations. For instance, an enterprise that is born without any employees may have one employee in the year following its birth, and two or more employees another year later. In this case, it would be counted as a birth in populations Rxx, R_1xx+1 and R_2xx+2. An enterprise birth with two or more employees in the year of birth will be counted in all three populations in the same year, i.e. Rxx, R_1xx and R_2xx.

5.1 From enterprise creations to enterprise births (population R)

The number of enterprise births is a key variable in the analysis of business demography as other variables such as the survival and growth of newly born enterprises are related to this concept. The production of statistics on newly born enterprises should be based on a clear definition and an agreement regarding its interpretation.

Definition

Enterprise births are defined (in Commission Regulation (EC) No 2700/98 of 17 December 1998 concerning the definitions of characteristics for structural business statistics) as follows:

"A count of the number of births of enterprises registered to the population concerned in the business register corrected for errors. A birth amounts to the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. Births do not include entries into the population due to: mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include entries into a sub-population resulting only from a change of activity."

The aim is to produce data on the creation of new enterprises that have started from scratch and that have actually started activity. An enterprise creation can be considered an enterprise birth if new production factors, in particular new jobs, are created.

Inclusions

Enterprises started by a person who previously performed the same activity, but as an employee should be included in the statistics on enterprise births.

Exclusions

Events leading to a creation of a new enterprise, but which should be excluded from the statistics on enterprise births are:

1. Enterprises that are created by merging production factors or by splitting them into two (or more) enterprises (break-ups, mergers, split-offs, restructuring)
2. Newly created enterprises that simply take over the activity of a previously created enterprise (take-over)
3. Any creations of additional legal units/enterprises solely for the purpose of providing a single production factor (e.g. the real estate or personnel) or an ancillary activity (see note below) for an existing enterprise.
4. An enterprise that is registered when an existing enterprise changes legal form. E.g. a successful sole proprietor moves operations from his home to another location and at the same time changes the legal form of the enterprise to a limited liability company.
5. Reactivated enterprises if they restart activity within 2 calendar years.
6. Temporary associations and joint ventures that do not involve the creation of new factors of production. The proportion of the new factors of production necessary for a joint venture to be considered a birth should be at least half, i.e. if less than half of the total employment of the joint venture enterprise is transferred from the participating enterprises, it is considered to be a birth. This is likely to be difficult to measure with any accuracy, so the following equation can be used as a proxy:

   Employment of new (joint venture) enterprise > 2 X (total employment of participating enterprises before creation of the joint venture – total employment of participating enterprises after creation of the joint venture)

Newly born national or foreign subsidiaries should be included in the enterprise births if:

1. They are real enterprises (legal units rather than just local units or branches) with autonomy of decision making; and

2. New production factors are created, rather than transferred from another unit.

Note - Ancillary Activities

The Task Force on Statistical Units has confirmed that the following activities can be ancillary as long as they are carried out in a legal unit within the same group as the legal unit they are serving, and they serve only that legal unit:

NACE Rev 1.1 code	*Activity*
28.62	Manufacture of tools
28.74	Manufacture of fasteners, screw machine products, chain and springs
45.50	Renting of construction or demolition equipment with operator
50.10	Sale of motor vehicles
50.20	Maintenance and repair of motor vehicles
50.30	Sale of motor vehicle parts and accessories
50.40	Sale, maintenance and repair of motorcycles and related parts and accessories
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
52.7	Repair of personal and household goods
60.24	Freight transport by road
63.1	Cargo handling and storage
63.2	Other supporting transport activities
63.4	Activities of other transport agencies
65.21	Financial leasing
70	Real estate activities
71.1	Renting of automobiles
71.21	Renting of other land transport equipment
71.22	Renting of water transport equipment
71.23	Renting of air transport equipment
71.31	Renting of agricultural machinery and equipment
71.32	Renting of construction and civil engineering machinery and equipment
71.33	Renting of office machinery and equipment, including computers
71.34	Renting of other machinery and equipment n.e.c.
71.4	Renting of personal and household goods n.e.c.
72	Computer and related activities
73.1	Research and experimental development on natural sciences and engineering
73.2	Research and experimental development on social sciences and humanities
74.11	Legal activities
74.12	Accounting, book-keeping and auditing activities; tax consultancy
74.13	Market research and public opinion polling
74.14	Business and management consultancy activities
74.15	Management activities of holding companies

74.2	Architectural and engineering activities and related technical consultancy
74.3	Technical testing and analysis
74.4	Advertising
74.5	Labour recruitment and provision of personnel
74.6	Investigation and security activities
74.70	Industrial cleaning
74.81	Photographic activities
74.82	Packaging activities
74.85	Secretarial and translation activities
74.86	Call centre activities
74.87	Other business activities n.e.c

These lists are not meant to be exhaustive. It is possible that, in certain circumstances, activities not on these lists could also be considered to be ancillary.

Identification of enterprise births

- **Step 1: Population of active enterprises = Nxx**

The population of active enterprises should be identified using the definition given in chapter 3.
For further steps in the procedure it is necessary to produce also populations N(xx-1) and N(xx-2).

- **Step 2: New enterprises in year xx**

The new enterprises in year xx are a subset of the population of active enterprises in year xx, which have taken up economic activity between 01.01 and 31.12. They can be identified by comparing the population of active enterprises in year xx with the population of active enterprises in year xx-1. New enterprises are identified as enterprises that are only present in year xx.

The basis of the method to be used is the concept of population of active enterprises. The date of registration should not be used as the primary means of identifying new enterprises as information on the date of commencement and cessation of activity is not available for all enterprises and all Member States, and such dates may represent administrative rather than statistical events.

- **Step 3: Elimination of reactivations**

The latest version of the Business Registers Recommendations Manual (chapter 14) suggests that enterprises dormant for less than two years are considered reactivations and therefore not new enterprises, whereas enterprises reactivated after more than two years are considered to be new.

The most straightforward way to identify reactivations is to compare the new enterprises in year xx with the population of active enterprises in year xx-2. If a new enterprise in year xx was active in year xx-2 then the enterprise is considered reactivated, and not a genuine new enterprise.

The result after the first three steps is the population of new enterprises (that are not reactivations).

- **Step 4: Elimination of other creations**

The identification of births is carried out by eliminating creations due to other events than births from the population of new enterprises, that is break-ups, split-offs, mergers and one-to-one take-overs. It may be envisaged to carry out pilot studies to collect and report data on these other events as well.
The method for identifying other creations compares the new enterprises (that are not reactivations) with the population of active enterprises for the current year (Nxx) and the previous year, using a matching process. For this purpose, the population of active enterprises should cover all sections of NACE Rev.1.1, including A, B and L.

The matching process should include matches on name, economic activity and location, either using national matching systems, or the following pair-wise approach:

- Match 1: Comparison of economic activity and location - If more than one match with the same location and economic activity are found, then manual checking should be done in order to verify whether the new enterprise can be considered an enterprise birth.
- Match 2: Matching of name and location
- Match 3: Matching of economic activity and name

The comparison should be carried out on the 4-digit level NACE Rev.1.1 and using the most detailed available information on the location. It is necessary to be aware that some activities naturally tend to be concentrated in certain locations, such as retailing (shopping malls), construction (large sites), and the “liberal professions” (shared premises), where there is an increased risk of false matches.

In addition to the matching above, it is also necessary to check for links between units, which may indicate that a new enterprise is not a birth, and to carry out additional matching or checking using any other nationally available information, such as telephone number, date of registration/deregistration at the administrative source, Official Journal, employer/employee links, local unit / local kind of activity unit details, etc. Particularly, multi-site enterprise births could be identified by checking for links between local units and enterprises.

- **Step 5: Correction of errors**

The method for the identification of enterprise births outlined above is based on the use of existing information. In principle, the identification can be carried out solely by the use of computer programmes. However, to finalise the identification of enterprise births some of the data should be investigated manually. The purpose of this investigation is to detect demographic events not accounted for in the process

outlined above and which might have considerable influence on the statistics on enterprise births.

The largest enterprises (within the population of remaining new enterprises) in terms of employment and turnover should be listed and investigated in detail to detect whether the event actually can be considered a birth. The sources used for this investigation could for instance be newspapers, the Internet, Official Journals, local unit / local kind of activity unit details, or direct contact with the enterprise. As this kind of analysis requires a lot of resources, it should be limited to the new enterprises with more than twenty employees.

Further, as many of the enterprise births have no employees in the year of establishment, it is also necessary to check enterprises with no employees but exceptionally high turnover. In order not to create too high a burden, it is difficult to put an exact limit above which the checking should be performed. Exceptionally high turnover could be defined as: higher than twice the average turnover in enterprises without employees in that sector of activity.

If the number of enterprises to be manually checked based on the above guidelines is considered to be too heavy a burden, manual checks of representative samples of the two categories of enterprises should be carried out. The results from the manual checking of the sample should then be raised on a random basis, so that a comparison between the number of enterprises identified as other creations based on the manual checking between the countries is possible. For example, if there are 1000 large potential births, but it is only possible to check a 10% sample (i.e. 100 enterprises), and of these only 20% (i.e. 20 enterprises) turn out to be births, then 20% of the 900 enterprises that were not checked should be chosen at random, and also considered to be births. It is recognised that this might lead to problems of accuracy for detailed breakdowns, but such problems should be minimised if the basis for raising the results of the sample check to the population of large births is sufficiently random.

Summary of the identification process of enterprise births

Population	Information used	Number of enterprises
Active enterprises in year xx	Turnover / employment	N_{xx}
Active enterprises in year xx-1	Turnover / employment	N_{xx-1}
Active enterprises in year xx-2	Turnover / employment	N_{xx-2}
New enterprises in year xx	ID number comparison of N_{xx} with N_{xx-1} andN_{xx-2}	X_{xx}
Sub-population from matching	Location and Sector	X_1
Sub-population from matching	Location and Name	X_2
Sub-population from matching	Sector and Name	X_3
Sub-population from matching	Links between legal units	X_4
Sub-population from matching	Other nationally available information (Official Journal, telephone number etc.)	X_5, X_6 etc
Sub-population from matching	Manual control of large units	X_z
Enterprise births (R)		**R_{xx}**

The sub-populations denoted X_1 to X_z in the table above are not mutually exclusive, i.e. the same enterprise might be included in several sub-populations. These sub-populations and population X_{xx} are regarded as intermediate outputs in the process of identifying enterprise births, and are not required to be submitted to Eurostat.

5.2 Employer enterprise births and economic enterprise births

The main component of the data on employer and economic enterprise births already exists in population of all enterprise births (population R). The enterprise births except the units below the employee thresholds cover largely the population of employer and economic enterprise births. However, there are also enterprises that do not reach an employee threshold already in the year of real birth, but only after some years of existence. The birth of a non-employer enterprise, for instance, should be counted again as an employer enterprise birth when it becomes an employer. These "Entries by growth" are not covered in the methodology on enterprise births described in section 5.1 and will be described in this section.

5.2.1 Employer enterprise births (population R_1)

There are two conditions which qualify an enterprise as an employer birth:

1. It was an enterprise birth (see section 5.1) in year xx, and had at least one employee in the year of birth, or
2. It existed before year xx, was not an employer for the two previous years and had at least one employee in year xx (entry by growth). The growth should not be due to the take-over of another enterprise.

The easy way to identify entries by growth and thus to complete the data on employer enterprise births would be to check which active employer enterprises in year xx (population N_1xx) had no paid employees in year xx-1. However, reactivations would be neglected, i.e. an apparent birth might in fact be a reactivation of a dormant unit. So it would be necessary to check whether a unit that has employees in year xx had no employees in xx-1 and xx-2.

The suggested step-by-step method for identifying employer enterprise births (population R_1xx) is as follows:

Step 1: Enterprises with employees in the year of birth

Enterprise births (population Rxx) excluding those without employees should be used to establish the population of newly born enterprises with at least one employee in the year of birth.

Step 2: Identifying former non-employers that become employers in xx (entries by growth)

In addition to the enterprise births with at least one employee, we need to identify those enterprises that existed before the year xx without employees, and that had at least one employee in xx. To make sure that no reactivations within two years are included (because they should not be considered as births), we need to check whether these units had no employees in years xx-1 *and* xx-2. The populations of "active non-employer enterprises" will be called N(0)xx-1 and N(0)xx-2.

Step 2a: Identifying non-employers in years xx-1 and xx-2

To cover all the units that could be entries by growth, the populations of active non-employer enterprises N(0)xx-1 and N(0)xx-2 should first be established. Then the following cases should be considered.

1) A unit is in population N(0)xx-1 and N(0)xx-2. => It was a non-employer in both years.

2) A unit is in population N(0)xx-1, but not in N(0)xx-2.

> If the unit is in population N_1xx-2 (Nxx-2 excluding N(0)xx-2), it was an employer in xx-2 and should be ruled out.

If the unit is not in population N_1xx-2 either, it was dormant in xx-2, or it was a non-employer birth in xx-1. => It was a non-employer in both years.

3) A unit is in population N(0)xx-2, but not in N(0)xx-1.

If the unit is in population N_1xx-1 (Nxx-1 excluding N(0)xx-1), it was an employer in xx-1 and should be ruled out.

If the unit is not in population N_1xx-1 either, it was dormant in xx-1. => It was a non-employer in both years.

In summary, the enterprises to be identified in step 2a are those which are

- in population N(0)xx-1 *or* N(0)xx-2 *or* both
- *and* which are *neither* in population N_1xx-1 *nor* in N_1xx-2

Step 2b: Checking whether non-employers in xx-1 and xx-2 had employees in xx

A check is needed on whether active non-employer enterprises identified by these cases in step 2a had ≥ 1 employee in year xx. If so, they are employer births in year xx.

Step 2c: Removing enterprises that grew by take-over

Results on take-overs should be available from the methodology used to identifyl enterprise deaths (see section 7.1). The information on units that took over other units (which ceased to exist but were not deaths) should be used to identify enterprises that reached the one employee threshold by taking over another one. These should be removed from the population of entries by growth.

Step 3: Adding up the results

Adding up the units identified in steps 1 and step 2 yields the population of employer enterprise births R_1xx.

Why not use a simpler method?

An alternative way of trying to identify employer births would be simply to check which employer enterprises in year xx had no employees in xx-1 and xx-2, i.e. whether they were not in populations N_1xx-1 and N_1xx-2. This condition would, however, hold true for all new enterprises with employees in year xx (population Xxx). The disadvantage, then, would be the lack of a check as to whether newly born enterprises in year xx with at least one employee were enterprise births (as described above). New employer enterprises in year xx that emerged from take-overs, mergers, break-ups, split-offs, change of legal form, etc. would be counted as births.

5.2.2 Economic enterprise births (population R_2)

In principle, the approach to identifying economic enterprise births (R_2) should be the same as for employer enterprise births (R_1). Again, there are two conditions that qualify an enterprise as an economic enterprise birth:

1. It was a enterprise birth in year xx, and had at least two employees in the year of birth or
2. It existed before year xx, had less than two employees in the previous two years and had at least two employees in year xx (entry by growth). The growth should not be due to the take-over of another enterprise.

The suggested step-by-step method for identifying economic enterprise births (population R_2xx) is as follows:

Step 1: Enterprises with at least two employees in the year of birth

Enterprise births (population Rxx), excluding all units with less than two employees, should be used to establish the population of newly born enterprises with at least two employees in the year of birth.

Step 2: Identifying enterprises that existed, but had less than two employees (entries by growth)

In addition to enterprise births with at least two employees, we have to identify enterprises that existed before the year xx with less than two employees, and that had at least two employees in xx.

Step 2a: Identifying enterprises with no or one employee in years xx-1 and xx-2

To cover all the units that might be entries by growth, the populations of active non-employer enterprises N(0,1)xx-1 and N(0,1)xx-2 should be established. Then the following cases should be considered again.

1) A unit is in population N(0,1)xx-1 and N(0,1)xx-2. => It was active but below the employee threshold in both years.

2) A unit is in population N(0,1)xx-1, but not in N(0,1)xx-2.

   If the unit is in population N_2xx-2 (Nxx-2 excluding N(0,1)xx-2), it was an employer with at least two employees in xx-2 and should be ruled out.

   If the unit is not in population N_2xx-2 either, it was dormant in xx-2, or it was born in xx-1, but below the employee threshold. => It was below the employee threshold in both years.

3) A unit is in population N(0,1)xx-2, but not in N(0,1)xx-1.

If the unit is in population N_2xx-1 (Nxx-2 excluding N(0,1)xx-1), it was an employer with at least two employees in xx-1 and should be ruled out.

If the unit is not in population N_2xx-1 either, it was dormant in xx-1. => It was below the employee threshold in both years.

In summary, the enterprises to be identified in step 2a are those which are

- in population N(0,1)xx-1 *or* N(0,1)xx-2 *or* both
- *and* which are *neither* in population N_2xx-1 *nor* in N_2xx-2

Step 2b: Checking whether units with less than two employees in xx-1 and xx-2 had two or more employees in xx

We have to check whether active enterprises with less than two employees as identified in step 2a had ≥ 2 employees in year xx. If so, they are economic births in year xx.

Step 2c: Removing enterprises that grew by take-over

Results on take-overs should be used to identify enterprises that reached the two employee threshold by taking over another one. These should be removed from the population of entries by growth.

Step 3: Adding up the results

Adding up the units identified in steps 1 and step 2 yields the population of economic enterprise births R_2xx.

5.3 Employment in newly born enterprises

Once we know how many enterprises are born in the economy, an assessment of their impact should be made. This can be evaluated by measuring the number of jobs or the additional turnover created. There is in particular interest in the number of jobs created by new enterprises as well as in the actual volume of work created, as some of the created jobs may be only part time.

To meet this demand, data should ideally be provided both as head counts and as full-time equivalents. Using solely the head count will overestimate the volume of work produced if the enterprise starts later than 1st January of year xx or if it has only part-time employment. However, as information on full-time equivalents is not available in all Member States it is proposed that as a first priority employment indicators should be measured in terms of head counts.

The head count of persons employed and the number of employees should be calculated as an annual average over the operating period of the enterprise. The average should be rounded to the nearest whole number. Depending on the

frequency of data updates, the annual average is the arithmetic mean of the infra-annual observations, or the only annual figure that is available, if this is the case. Using an annual average over the operating period ensures that seasonal activities will also be included, which would not be the case if the employment at a certain reference point were used.

The operating period for employer enterprise births and economic enterprise births should be the period from which an enterprise reached the respective employee threshold. If for instance an enterprise employs the first and only employee only in the fourth quarter of a year, it should still be considered an 'employer birth' in that year, although the annual average of the number of employees would be 0 (four observations 0-0-0-1 = 0.25 rounded to 0). As the period of activity as an employer in this case is only the last quarter, the number of employees for this year would be 1.

Other examples of employment measures:

1) If an enterprise has activity during 3 months in the summer with two persons employed, the annual average head count will be two.

2) If the enterprise is created during the last quarter of the year and the only observation on employment is for this quarter, this observation should be used as the annual average.

Estimation method

If either of the variables "employees" or "persons employed" is missing, it should be estimated using the following method. The number of persons employed is simply estimated by adding an estimate of the number of working proprietors to the number of employees:

sole proprietorship:	number of employees + 1
partnership:	number of employees + 2
limited liability company:	number of employees + 0

Some refinement of the method by legal form and/or economic activity may be necessary to take account of national legislation on legal forms.

5.4 Indicators

The data may be used to produce further indicators related to enterprise births, such as the following:

- Births as a percentage of the population of active enterprises (birth rates).
- Births by size class.
- Births per 10.000 of the population.
- Births per 10.000 of total active population aged 15-64
- Correlations of enterprise births with GDP and unemployment

Additional indicators will be produced to demonstrate the impact of the newly born enterprises to the economy:

- Persons employed in newly born enterprises in year xx as a proportion of the total number of persons employed in the population of active enterprises in year xx (both in head counts)
- Employees in newly born enterprises in year xx as a proportion of number of persons employed in newly born enterprises in year xx (both in head counts)

The first of these indicators is set up in an attempt to reflect the employment creation potential of newly born enterprises. The second attempts to reflect the potential employment creation going beyond the entrepreneurs themselves.

The employment created by employer enterprise births should be measured only in the number of employees, not the number of persons employed. An employer enterprise birth means that new paid labour is created, but it is well possible that the enterprise existed already before with self-employed and unpaid labour. Thus it could be misleading to assume that an employer enterprise birth leads to the creation of self-employment and/or unpaid labour (i.e. persons employed who are not employees).

Measurements of the employment created in economic enterprise births should be made with particular caution, because the fact that an enterprise in the population of ’economic enterprise births’ does not necessarily mean that two jobs were created. If for instance an enterprise existed already before, but had only one employee, then the economic enterprise birth accounted for the creation of only one new job.

BUSINESS DEMOGRAPHY

RECOMMENDATIONS MANUAL

Chapter 6
Survival and Growth

6. Survival and Growth

6.1 Survival of newly born enterprises

Typology of survival

The survival of an enterprise is defined in the following way:

- An enterprise born in year xx or having survived to year xx from a previous year is considered to have survived in year xx+1 if it is active in terms of turnover and/or employment in any part of year xx+1 (= survival without changes).
- An enterprise is also considered to have survived if the linked legal unit(s) have ceased to be active, but their activity has been taken over by a new legal unit set up specifically to take over the factors of production of that enterprise (= survival by take-over).

Activity is defined as any turnover and/or employment in the period from 1.1 to 31.12 in a given year. For the populations of employer enterprise births and economic enterprise births, the employee thresholds of one, or two employees respectively, apply to the employment criterion. This definition is therefore in accordance with that used for the population of active enterprises, and enterprise births, as described previously. If sufficient information on turnover or employment is lacking in order to determine whether or not an enterprise is active, then national methods leading to this aim will be accepted.

This definition of survival excludes cases where enterprises merge, or are taken over by an existing enterprise in year xx. In these cases the continuation of the enterprise involves an enterprise established before year xx+1 and therefore the enterprise is not considered to have survived.

The survival of an enterprise is an event that should always be observed between two consecutive years. For instance, an enterprise that was born in year xx should be considered as having survived to xx + 2 only if it was active also in year xx + 1, and so forth. The survivals from a survival year to the following year should therefore be identified in the same way as the survivals from a birth year to the following one. Referring to the populations of employer births and economic births, this means that the employee threshold should be reached in every year as well. A newly born enterprise according to the definition of economic birth, for instance, would be considered as a survival only as long as it has at least two employees. As soon as it moves below the threshold of two employees, it would be considered as not having survived (although not necessarily a death).

Consistency with enterprise births

To ensure consistency between data on births and survivals, it is important that the identification of cases where an enterprise is taken over by a new enterprise is based on the use of the same information as when evaluating whether a new

enterprise is a birth or not. The enterprise birth methodology states that the identification is carried out by firstly matching on name, location and economic activity, and secondly using other information available, for instance links between legal units. The methodology for determining survival should mirror that used for births.

The second rule of the definition also implies that the enterprise is only counted as survived, if the enterprise that takes over the factors of production is a new enterprise, i.e. an enterprise that commences activity in the year of the take-over and which is not a reactivation. A survival by take-over does not necessarily lead to the cessation of the original unit. In some cases for instance, the original unit that has handed over the production factors to the new unit may become an ancillary unit to this new one. The continuity of the production factors should be the main criterion for the decision which unit to follow for its survival.

Finally it should be noticed that an enterprise birth might fulfil both rules at the same time, e.g. an enterprise birth in year xx is active in part of year xx+1 and then is taken over by a new enterprise, which commences activities in xx+1. In this case, the enterprise birth is included in the population of active enterprises in year xx+1, but at the same time the enterprise is taken over according to the second rule. As the newly born enterprise has had activity in year xx+1 it is considered as survived. A link should be coded between the units to indicate the take-over and taken into consideration when producing statistics for xx+2.

Reactivations

When calculating survival rates a decision on how reactivated enterprises should be treated must be taken. Once an enterprise has been judged as not having survived, there should be no further checks for reactivation. It is considered that doing such checking would complicate the production process considerably and delay the data, without adding much value, as reactivations among recent enterprise births are probably rare. This principle should be applied equally to enterprise births (R), employer enterprise births (R_1) and economic births (R_2).

In some cases, it may be possible to observe that an apparent reactivation is due to a temporary lack of administrative information on the activity of the enterprise, which in reality was active without any gaps. In these cases, it is recommended to consider the unit as having survived and to impute the missing employment variables. Where appropriate, previous data on survivals should then be corrected.

Populations

The production of statistics on survival can be based on three populations, which are all part of the production of the statistics on enterprise births:

- Enterprise births in year xx, or enterprises having survived to xx from a previous year.
- Active enterprises in year xx+1
- Enterprises that have commenced activity in year xx+1 with the purpose of taking over the factors of production of an enterprise that commenced activity before xx+1. As it is necessary to identify the link between enterprises, the

data set should consist of two variables, namely the identity number of the enterprises that cease to exist and the identity number of the enterprises that take them over.

Matching the populations

Using these three populations, it is possible to identify surviving enterprises, enterprises that cease to exist and enterprises that are taken over, by matching the populations using enterprise identity number as the key. The possible outcomes are given in the table below:

Production of survival data for xx+1

Outcome	Births or survivals in year xx	Active enterprises in year xx+1	Enterprises taken over by a new enterprise
A	√		
B	√	√	
C	√		√
D	√	√	√

Outcomes A to D can be described as follows:

- A - This is the simplest outcome of the matching, where an enterprise is not present in the population of active enterprises in year xx+1 or in the population of enterprises taken over by a new enterprise. These cases are therefore enterprises that have not survived in xx+1.
- B - This is the case, where an enterprise is present in the population of active enterprises in year xx+1 and not in the population of enterprises taken over by a new enterprise. These enterprises are classified as survived in xx+1 without any changes.
- C - This is the case, where an enterprise is not present in the population of active enterprises in year xx+1, but is present in the population of enterprises taken over by a new enterprise. These enterprises are classified as survived between year xx and year xx+1, by having been taken over by a new enterprise. (Take-over took place in xx).
- D - This is where an enterprise is present in the population of active enterprises and at the same time in the population of enterprises taken over by a new enterprise. This means that two enterprises coexist at for instance the same location and with the same economic activity in year xx+1. The enterprise has survived in year xx+1, but a take-over has happened in that year. The link between the units should be recorded and the new enterprise should be followed when producing survival statistics for xx+2. For the year xx+1 the link should also be used to avoid counting both units, i.e. the one taken over and the one taking over, as active enterprises.

Manual checks

In order to verify the accuracy of the results, some manual checks should be carried out. The manual control should be designed to capture large changes (decline or growth) in the turnover or employment data between xx and xx+1, and should include enterprises that survive and that cease to exist. It is recommended to check at least all enterprises that:

a) have more than 5 employees either before or after the change (or both), and;
b) change by more than a factor of 3 (i.e. employment after the change is greater than 300% or less than 33% of the employment before the change.

Split-offs and break-ups

Split-offs and break-ups of enterprises between years xx and xx+1 are more complicated as regards survival. In both cases the production factors are continued, but the enterprise as such has not. Such cases are considered to be rare in newly born enterprises in the first few years after birth and their impact on the statistics on survival of newly born enterprises is therefore limited. Further, it is probably difficult to detect a split-off in practice, as the newly born enterprise of year xx still exists and is active in year xx+1. As a pragmatic approach, in split-off cases, the original enterprise should be considered as survived, and the part that has split-off will not be followed. In the case of break-ups, the original enterprise is not considered to have survived.

Indicator

The indicator to be calculated regarding survivals is:

- Survival rate of newly born enterprises

6.2 Measuring growth

The term growth is used in business demography to study how cohorts of enterprises develop. Growth is measured in terms of a change in size (in this case employment) over time. It is expected that growth for births will generally be positive. There will be occasional cases for births, and more frequent cases for the population of active enterprises, where the growth measured in this way will be negative.

Growth in newly born enterprises

Newly born enterprises are in general relatively small in the year of establishment. To fully evaluate their impact on the economy it is necessary to follow the newly born enterprises during a longer period of time.

For the observation of the survivals and growth of newly born enterprises it is important to keep their classification into the size class and NACE activity

unchanged from the year of birth. The size class should be kept also if the enterprise outgrows it, and the NACE activity should be kept also if it changes in reality, even if the activity moves out of the scope of this data collection.

Growth in existing enterprises

Some annual figures on the population of active enterprises are necessary in order to compare the statistics on growth in the newly born enterprises with changes in the population as a whole.

Growth leading to employer / economic birth

When studying the growth of newly born or existing enterprises, it should be noted that the growth of a small enterprise may qualify it as a "birth" within another category. A small enterprise that was a real birth (population R) in a given year, may be recorded as an employer birth (R_1) and an economic birth (R_2) not only in the same year, but possibly with a delay of one or more years when it reaches the respective employee threshold. Even an active enterprise that has never been recorded as a birth (because it was not covered by previous data collections, or not the result of a real birth) but is in a population of active enterprises (N) may qualify as an employer or economic birth by growth (see chapter 5).

Indicators

Indicators on the growth of newly born enterprises may be produced, such as the following:

- The rate of growth of the number of persons employed in newly born enterprises
- The rate of growth of surviving enterprises
- The average number of jobs per enterprise in newly born enterprises during the first five years of operation

The advantage of these indicators is that they enable a direct comparison of growth rates across countries, because they reduce the impact of differences in the size of the respective economies.

The first indicator is calculated as the number of persons employed in newly born enterprises in the second year of operation divided by the number of persons employed in newly born enterprises in the initial year.

The second indicator is the rate of growth of the number of persons employed in the newly born enterprises. It is calculated as the number of persons employed in surviving enterprises in xx+n divided by the number of persons employed in the year of birth (=xx) of those same enterprises that have survived to xx+n

The third indicator is calculated in order to follow the development of the average number of jobs in the newly born enterprises during their five first years of operation.

The number of persons employed in xx+n is divided by the number of surviving enterprises in xx+n (of newly born enterprises in xx).

The measurement of relative changes of employment figures neglects the fact that a growth compared to a larger initial figure also reflects a higher contribution to employment. Therefore weights may be applied to the indicators, e.g. by using Birch rate analysis.

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Chapter 7
Enterprise Deaths

7. Enterprise Deaths

Section 7.1 explains the suggested methodology for the identification of enterprise deaths. In analogy to births, enterprise deaths are studied in all statistics on business demography, regardless of any thresholds. They are the only death events that are studied if no threshold in terms of the number of employees is set. In addition to real enterprise deaths, exits by decline may occur in data collections using an employee threshold. These are explained in section 7.2 on employer enterprise deaths and economic deaths.

According to the use of employee thresholds, the following populations of enterprise deaths can be distinguished:

Enterprise deaths (population **D**): Enterprise deaths covering all enterprises, regardless of whether they are employers or not. No general threshold is applied to the size of the enterprise in terms of employment or any other characteristics.

Employer enterprise deaths (population $\mathbf{D_1}$): Deaths of enterprises with at least one employee. This population consists of enterprise deaths (population D) that had at least one employee in the year of death, and of enterprises that move below the threshold of one employee for at least two years.

Economic enterprise deaths (population $\mathbf{D_2}$): Deaths of enterprises with at least two employees. This population consists of enterprise deaths (population D) that had at least two employees in the year of death, and of enterprises that move below the threshold of two employees for at least two years.

Again in analogy to enterprise births, the same unit may be recorded as an enterprise death in more than one of these populations. For instance, an enterprise may move below the threshold of two employees in a given year, below the threshold of 1 employee in the following year, and then cease its activity permanently in the next year. In this case, it would be counted as a death in populations D_2xx, D_1xx+1 and Dxx+2. A real death with two or more employees in the year of death will be counted in all three populations in the same year, i.e. Dxx, D_1xx and D_2xx.

7.1 From enterprise closures to enterprise deaths (population D)

Enterprise deaths

For the sake of consistency, and in line with user needs, the method of comparing populations of active enterprises used for the production of data for enterprise births should also be followed for enterprise deaths. This will also help to gain from synergies in processing.

The Commission Regulation No 2700/98 defines enterprise deaths as follows:

"A count of the number of deaths of enterprises registered to the population concerned in the business register corrected for errors. A death amounts to the dissolution of a combination of production factors with the restriction that no other enterprises are involved in the event. Deaths do not include exits from the population due to mergers, take-overs, break-ups and restructuring of a set of enterprises. It does not include exits from a sub-population resulting only from a change of activity."

Events leading to a closure of an enterprise, but which should be excluded from the statistics on enterprise deaths are:

1. Enterprises that close down due to merging or breaking-up of production factors (break-ups, mergers, restructuring)
2. Enterprises whose activity is taken over by another enterprise (take-over)
3. Enterprises that are deleted due to a change of legal form, e.g. a successful sole proprietor moving operations from his home to another location and at the same time changing the legal form of the enterprise to a limited liability company is a case that should be excluded.
4. Reactivated enterprises if they restart activity within 2 calendar years.

For many enterprises there is no direct way to determine death, and information on the date of cessation may not be forthcoming from an administrative source or may reflect only administrative death. Hence, the decision that an enterprise has ceased to exist or has become permanently inactive will have to be made by combining information from different sources.

Identifying deaths

Populations of active enterprises are compared in order to identify the potential population of enterprise deaths. ID numbers of enterprises that were active during at least part of year xx are matched with the ID numbers of enterprises active in years xx+1 and xx+2. The matching process should result in two sets of enterprise records:

1. Enterprises active in xx and not active in xx+1 or xx+2 (= enterprise closures = potential enterprise deaths in year xx, to be investigated further)
2. All other enterprises.

- **Step 1: Population of active enterprises = Nxx**

The population of active enterprises should be identified using the definition given in chapter 3.
For further steps in the procedure it is necessary to produce also populations N(xx+1) and N(xx+2).

- **Step 2: Cessations in year xx**

The cessations in year xx are a subset of the population of active enterprises in year xx, which have ceased their economic activity between 01.01 and 31.12. They can be identified by comparing the population of active enterprises in year xx with the population of active enterprises in year xx+1. Cessations are identified as enterprises that are only present in year xx.

Again, the basis of the method to be used is the concept of population of active enterprises. The date of deregistration should not be used as the primary means of identifying cessations as information on the date of commencement and cessation of activity is not available for all enterprises and all Member States, and such dates may represent administrative rather than statistical events.

- **Step 3: Elimination of reactivations**

As in step 3 of the identification of enterprise births, cessations should be checked for reactivation in the following two calendar years, because enterprises dormant for less than two years are considered reactivations and therefore not deaths followed by a birth. An enterprise death occurs only if the unit has been inactive for at least two years.

The way to identify reactivations as suggested in step 3 of the chapter enterprise births, applies equally to the context of enterprise deaths, i.e. if a new enterprise in year xx+2 is identified as a reactivation, then the enterprise is not considered an enterprise death in year xx.

- **Step 4: elimination of other cessations**

In order to find the events that were not real enterprise deaths, but rather cessations due to events like break-ups, mergers or take-overs, a matching of criteria (as for enterprise births) should be carried out. The pairwise matching is used in the same way to identify the cases where another unit is involved in the cessation of the enterprise. As for enterprise births, the matching should consider name, location and economic activity (on the most detailed level of address and 4-digit level of NACE). For this purpose, the population of active enterprises should cover all sections of NACE Rev.1.1, including A, B and L. Some manual checking will have to be done, mostly on near matches by name. Possible multiple matches should be treated the same way for deaths as for births.

The last automated check should be for links between legal units. If a link is found, this is a strong indicator for other cessation than death. As with births, other nationally available information should also be used where appropriate, and manual checks of all large cessations (i.e. 20 or more employees) should also be carried out, though again a sample may be used if the numbers are too high (see step 5 in chapter 5).

7.2 Employer enterprise deaths and economic deaths

The main component of the data on employer and economic enterprise deaths already exists in population of all enterprise deaths (population D). The enterprise deaths except the units below the respective employee thresholds cover largely the population of employer and economic enterprise deaths. However, there are also enterprises that move below the threshold of one or two employees, but that continue activity below this threshold.These should be considered employer enterprise deaths, or economic deaths respectively., These enterprises may well be counted again as enterprise deaths (according to chapter 7.1) when they cease all economic activity. "Exits by decline" are not covered in the methodology on enterprise deaths described in section 7.1 and will be described in this section. The time perspective has to be opposite to the one used for "entry by growth". As it was shown in chapter 5.2, entries by growth are identified by looking at the units that were active but below the respective employee threshold in the two years *before* the year in question (xx-1 and xx-2). "Exits by decline" will have to be identified by looking at the units that dropped below the employee threshold in the two years *after* the year in question.

7.2.1 Employer enterprise deaths (population D_1)

There are two conditions which qualify an enterprise as an employer death:

1. It was an enterprise death (see section 7.1) in year xx, and had at least one employee in the year of death, or
2. It had at least one employee in year xx, continued activity but was not an employer for the two following years (exit by decline). The decline in employment should not be due to a split-off.

The suggested step-by-step method for identifying employer enterprise deaths (population D_1xx) is as follows:

Step 1: Enterprises with employees in the year of death

Enterprise deaths (population Dxx) excluding those without employees should be used to establish the population of enterprises with at least one employee in the year of their death.

Step 2: Identifying former employers that become non-employers in xx (exits by decline)

In addition to deaths with at least one employee, we have to identify those enterprises that had at least one employee in xx and continued to exist afterwards without employees. To make sure that no reactivations within two years are included (these should not be considered as deaths), we have to check whether these units had no employees in years xx+1 *and* xx+2. The populations of "active non-employer enterprises" will be called N(0)xx+1 and N(0)xx+2.

Step 2a: Identifying non-employers in years xx+1 and xx+2

To cover all the units that might be exits by decline, the following cases should be considered, and the populations of active non-employer enterprises N(0)xx+1 and N(0)xx+2 should first be established.

1) A unit is in population N(0)xx+1 and N(0)xx+2. => It was a non-employer in both years.

2) A unit is in population N(0)xx+1, but not in N(0)xx+2.

> If the unit is in population N_1xx+2 (Nxx+2 excluding N(0)xx+2), it was an employer in xx+2 and should be ruled out.
>
> If the unit is not in population N_1xx+2 either, it was dormant in xx+2 and possibly a death. => It was a non-employer in both years.

3) A unit is in population N(0)xx+2, but not in N(0)xx+1.

> If the unit is in population N_1xx+1 (Nxx+1 excluding N(0)xx+1), it was an employer in xx+1 and should be ruled out.
>
> If the unit is not in population N_1xx+1 either, it was dormant in xx+1. => It was a non-employer in both years.

In summary, the enterprises to be identified in step 2a are those which are

- in population N(0)xx+1 *or* N(0)xx+2 *or* both
- *and* which are *neither* in population N_1xx+1 *nor* in N_1xx+2

Step 2b: Checking whether non-employers in xx+1 and xx+2 had employees in xx

We have to check whether units identified by these cases in step 2a had ≥ 1 employee in year xx. If so, they are employer deaths in year xx.

Step 2c: Removing enterprise that shrunk by split-off

Results on split-offs should be available from the methodology used to identify enterprise births (see section 5.1). The information on new enterprises that were split-offs (and therefore no real enterprise births) should be used to identify original enterprises that moved below the one employee threshold because a new unit emerged from a split-off. These original enterprises should be removed from the population of exits by decline.

Step 3: Adding up the results

Adding up units identified in steps 1 and 2 yields the population of employer enterprise deaths D_1xx.

7.2.2 Economic enterprise deaths (population D_2)

There are again two conditions which qualify an enterprise as an economic death:

1. It was an enterprise death in year xx, and had at least two employees in the year of death, or
2. It had at least two employees in year xx, continued activity but had less than two employees for the two following years (exit by decline). The decline in employment should not be due to a split-off.

The methodology for identifying the economic deaths follows from the method used for employer deaths:

Step 1: Enterprises with two or more employees in the year of death

Enterprise deaths (population Dxx), excluding units with less than two employees, should be used to establish the population of enterprises with at least two employees in the year of their death. Using the same methodology as for the current harmonised data collection ensures that only real deaths are counted, but not cessations of units due to merger or take-over

Step 2: Identifying former employers with two or more employees (exits by decline)

In addition to deaths with at least two employees, we have to identify enterprises that had at least two employees in xx and continued to exist afterwards with less than two employees.

Step 2a: Identifying enterprises with less than two employees in years xx+1 and xx+2

To cover all the units that might be exits by decline, the populations of active non-employer enterprises N(0,1)xx+1 and N(0,1)xx+2 should first be established. Then the following cases have to be considered.

1) A unit is in population N(0,1)xx+1 and N(0,1)xx+2. => It was active and below the employee threshold in both years.

2) A unit is in population N(0,1)xx+1, but not in N(0,1)xx+2.

> If the unit is in population N_2xx+2 (Nxx+2 excluding N(0,1)xx+2), it had at least two employees in xx+2 and should be ruled out.
>
> If the unit is not in population N_2xx+2 either, it was dormant in xx+2, and possibly a death. => It was below the employee threshold in both years.

3) A unit is in population N(0,1)xx+2, but not in N(0,1)xx+1.

If the unit is in population N_2xx+1 (Nxx+1 excluding N(0,1)xx+1), it had at least two employees in xx+1 and should be ruled out.

If the unit is not in population N_2xx+1 either, it was dormant in xx+1. => It was below the employee threshold in both years.

In summary, the enterprises to be identified in step 2a are those which are

- in population N(0,1)xx+1 *or* N(0,1)xx+2 *or* both
- *and* which are *neither* in population N_2xx+1 *nor* in N_2xx+2

Step 2b: Checking whether units with less than two employees in xx+1 and xx+2 had two or more employees in xx

We have to check whether units identified by these cases in step 2a had ≥ 2 employees in year xx. If so, they are economic deaths in year xx.

Step 2c: Removing enterprise that shrunk by split-off

Enterprises that moved below the two employee threshold because a new unit emerged from a split-off should be removed from the population of exits by decline.

Step 3: Adding up the results

Adding up the units identified in steps 1 and 2 yields the population of economic enterprise deaths D_2xx.

7.3 Units in liquidation

Information from administrative sources may indicate that a unit is in its liquidation process, and that the remaining activity is related to this process itself, e.g. turnover from the sale of production factors, or employment due to administrative matters. Although this turnover or employment is not related to the enterprise's genuine activity, it is recommended to consider the enterprise alive until it ceases also this activity. As it cannot always be identified whether activity is related only to the liquidation process or not, and as the availability of administrative information varies across countries, the benefit of this approach is that results are comparable.

7.4 Provisional data on enterprise deaths

The check for reactivation within two years leads to a time lag of one year of the data availability compared with the data on the population of active enterprises, enterprise births and survivals. While all other data are to be delivered to Eurostat in the second year after the reference period (t+2), confirmed data on deaths are available on in the third year. In order to improve the timeliness of the data on enterprise deaths, provisional results in year t+2 are asked to be delivered using the best national methods available for estimation. As examples, the following methods or a combination of both could be used:

1) If data collections have already been conducted, the known ratio between enterprise deaths and either reactivations or the total number of cessations from previous reference years can be used to estimate the number of enterprise deaths based on the available number of cessations. This may however not be possible at detailed breakdown level.

2) Based on the information that is available on reactivations during the year t+2, during which results are prepared, preliminary data on the enterprise deaths excluding the known reactivations can be produced. This will however lead to an overestimation of enterprise deaths, as reactivations occurring later in the year t+2 are not taken into account or estimated.

7.5 Impact of deaths

As well as indicators on the number of enterprise deaths, there is a demand for data on the impact of these deaths. This can only partly be satisfied by studying deaths by size-band, therefore more accurate measures are needed. The impact can be measured both in terms of the effect on the labour market, i.e. the amount of employment lost, or the effect on the economy in financial terms, i.e. the amount of turnover lost.

Employment

It is clear that the employment lost when an enterprise death occurs is of interest to policy makers. What is less clear is the time at which that employment should be recorded. Few enterprises suddenly change from being fully active to being dead, most go through a period of contraction lasting months, or possibly even years. This means that if employment is measured at the exact moment of death, the impact of the loss of that enterprise could be under-stated.

Conversely, if employment is measured for a previous period, e.g. the year before that in which the death occurred, there is the problem of how to deal with relatively short-lived enterprises, i.e. those that only survive for a few months. These enterprises may not have had any activity or employment in the previous period.

This problem is eased to some extent by the use of average employment over the period during which the enterprise was active. If infra-annual employment data are available, the decline in employment immediately before death will be somewhat

masked by using an average figure, particularly if the death occurs towards the end of the period. It should be noted, however, that although this may reduce the problem, it is unlikely to solve it entirely.

Another scenario is that only one observation is available for a given period. This is particularly likely for smaller enterprises. In this case it is obviously not possible to take an average, but the observation may, in many cases, reflect the position several months before the death, so may not be affected by the period of pre-death decline.

In summary, the employment lost in an enterprise death should be measured as an average of the the available observations during the remaining period of activity in the year of death. This applies equally to employer enterprise deaths and economic deaths. For instance, an enterprise that had two employees in the first two quarters of a year and no employees in the following two quarters would be an employer employer enterprise death and an economic death with two employees (average during the operation period).

7.6 Indicators

The following indicator related to enterprise deaths may be produced:

- Number of enterprise deaths as a percentage of the population of active enterprises.
- Correlations of enterprise deaths with GDP and unemployment

It is also proposed to add the following two indicators on the impact of deaths in terms of employment loss. These will be tested, and if successful, may be implemented in future data collections.

- Persons employed in enterprises that die in year xx as a proportion of the total number of persons employed in the population of active enterprises in year xx (both in head counts)
- Mean employment loss per death, measured in terms of persons employed (head count)

Employment loss in employer enterprise deaths should be measured only according to the number of employees, not the number of persons employed. An employer enterprise death means that no paid employees are left, but it is well possible that the enterprise continues with self-employment and unpaid labour only. Thus it could be misleading to assume that an employer enterprise death leads to the loss of self-employment and/or unpaid labour (i.e. persons employed who are not employees).

Measurements of the employment lost in economic enterprise deaths should be made with particular caution, because the fact that an enterprise in the population of ’economic enterprise deaths’ does not necessarily mean that all jobs were lost. If for

instance an enterprise continues to exist with only one employee, then the economic enterprise death obviouly accounts for the loss of all jobs in the enterprise except the remaining one.

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Chapter 8
High-Growth Enterprises

8. High-growth enterprises

8.1 Definition

High-growth enterprises can be defined both in terms of employment (number of employees) and in terms of turnover. In order to study the phenomenon of high enterprise growth, it is suggested to identify high growth enterprises according to both criteria.

The definition of high-growth enterprises is as follows:

> *All enterprises with average annualised growth greater than 20% per annum, over a three year period, and with 10 or more employees in the beginning of the observation period, should be considered as high-growth enterprises. Growth can be measured by the number of employees or by turnover.*

It is recommended to use the size threshold of 10 employees also for the identification of high-growth enterprises measured in turnover. The advantage is that the initial population is the same, regardless of whether growth is measured in employment or turnover. Moreover, it would be difficult to apply a consistent turnover threshold across all countries participating in the data collection. In order to compare high-growth enterprises of roughly the same size, it would be necessary anyway to suggest a turnover threshold that corresponds to a certain employment size.

8.2 Calculation

When trying to identify high-growth enterprises, it is not necessary to check the change in employee numbers or turnover from one year to the next over a three-year period. It is enough to consider only the population of active enterprises with 10 or more employees (N_{10}) in year xx-3 and in year xx. As *average annualised growth* has to be measured, the formula describing high-growth enterprises is:

Measured in employment

$$\sqrt[3]{\frac{employees_{(xx)}}{employees_{(xx-3)}}} - 1 > 0.2$$

Measured in turnover

$$\sqrt[3]{\frac{turnover_{(xx)}}{turnover_{(xx-3)}}} - 1 > 0.2$$

In practice, average annualised growth of 20% over three years would be equal to 72.8% growth from xx-3 to year xx. Thus, the easiest way to find out which of the population N_{10}xx-3 can be considered high-growth enterprises in year xx is to

- check by ID number comparison which enterprises in population N_{10}xx-3 are still in population N_{10}xx, and then
- check whether the number of employees, or turnover respectively, in year xx is at least 1.728 times higher than in year xx-3.

8.3 Exclusions

When identifying the population of high-growth enterprises for a given reference year xx, enterprises that were born three years ago should be excluded from the population. The reason is that the measurement of growth in terms of turnover would be inaccurate. The population R_{10}xx-3 consists of all the newly born enterprises with at least 10 employees in the year of birth. As these enterprises were born at different points in time throughout the whole year xx-3, one can assume that *on average* these enterprises were born around 1st July. This means that their average turnover in the birth year is significantly lower than in the following years simply because of the shorter average period of activity in the birth year. A seeming turnover growth from the birth year to following years may be due only to the fact that the operating period in the birth year was only a few months long. Therefore the data on high-growth enterprises should be cleaned by removing units that were born in year xx-3. Otherwise it would be necessary to annualise the turnover in the birth year from the operating period to the whole calendar year, which would introduce imprecision and make necessary the identification of the date when the enterprise first generated turnover.

The same problem would not occur if only employment were measured, because it is measured as an annual average over the operating period and does not accumulate over the year. However, to ensure that high-growth firms are always identified from the same base population, population R_{10}xx-3 should be removed also from high-growth enterprises measured in the number of employees.

If the growth in the number of employees or turnover was due to mergers and take-overs, the enterprise in question should not be considered a high-growth enterprise.

In practice, the problem of growth by *merger* should not occur if a new ID number is assigned to the new enterprise resulting from the merger. An enterprise that was in population N_{10}xx-3 will no longer be found in population N_{10}xx if it merged with another one.

A *take-over* may also increase employment and turnover considerably, so that the enterprise could mistakenly be considered a high-growth enterprise. While the enterprise that is taken over ceases to exist, the enterprise taking over the other one continues and keeps its ID number. As information on take-overs should be a by-product of the methodology used for identifying enterprise deaths (section 7.1), this information could be used also to identify units that show high growth because of such a take-over, and that should therefore be excluded from the results.

8.4 Gazelles

Gazelles are the subset of high-growth enterprises which are up to five years old. The definition is

> *All enterprises up to 5 years old with average annualised growth greater than 20% per annum, over a three year period, and 10 or more employees in the beginning of the observation period, should be considered as gazelles.*

The method for identifying gazelles is the same as for high-growth enterprises in general.

The difference in scope and data reporting is that we consider populations of newly born enterprises (R_{10}) rather than populations of active enterprises (N_{10}).

In principle, the high-growth period of 3 years, referring to a population R_{10}, can occur at different stages in the five-year survival period. In a given reference year xx, gazelles may be in the different cohorts of newly born enterprises R_{10}xx-3, R_{10}xx-4 or R_{10}xx-5, i.e. enterprise in their third, fourth or fifth year of survival. To be consistent with the exclusions suggested for high-growth enterprises in general, survivals from population R_{10}xx-4 and R_{10}xx-5 should be considered, but not from population R_{10}xx-3.

The identification of high-growth enterprises on an annual basis may lead to an inclusion of an enterprise in the population of high-growth enterprises in several years. The question arises whether a high-growth enterprise, and thus also a gazelle, should be counted in more than one reference year if it fulfils the given definition. The suggestion is to do so. For instance, a gazelle born in year xx could be counted as such either once or twice, if it shows high growth over a three year period from year xx+1 to x+4 and/or xx+2 to xx+5. As the data on high-growth enterprises are collected on an annual basis, the question whether an enterprise was identified as a high-growth enterprise in any previous year is not relevant.

8.5 Indicators

Data on high-growth enterprises and gazelles will be requested in terms of the numbers of enterprises. Employment and turnover should be used as measures of

growth and thus criteria for the identification of high-growth enterprises, but not as characteristics to be reported in the statistics.

The following indicators based on the numbers of enterprises may be produced:

- Rate of high-growth enterprises: Number of high-growth enterprises as a percentage of the total population of active enterprises with at least 10 employees.
- Rate of gazelles among newly born enterprises: Number of gazelles as a percentage of all active enterprises that were born up four or five years ago.