Introduction

1. Representing large businesses on a business register can prove challenging for statistical organisations. Large business structures are usually complex from both organisational and statistical unit perspectives. This complexity necessitates profiling and generates opportunities for richer economic statistics. The data landscape has changed significantly in the past ten years, with increasingly vast and readily available administrative data sets. In response to this the Australian Bureau of Statistics (ABS) has reviewed the ABS Economic Units Model and the associated profiling procedures.

2. The introduction of the 2002 ABS Economic Units Model coincided with major taxation reforms, and the introduction of the Australian Business Number (ABN). An ABN is issued to legal entities that register with the Australian Business Register (ABR)\(^1\). For the purposes of this paper, the Legal Entity and the ABN terms are used interchangeably.

3. In 2002, the Australian Taxation Office began to supply the ABS with a monthly administrative data feed, containing the unique ABN identifier and taxation data items. This unit record ABN data is used to populate smaller and less complex businesses (eg. single Enterprise Group, single Legal Entity and single production unit).

\(^1\) Registering for an ABN is optional for businesses with a turnover less than $75,000 and non-profit organisations with a turnover less than $150,000. In practice, most micro businesses still choose to register for an ABN.
4. Enterprise Groups in the ABS profiled population commonly consist of multiple Legal Entities
(ABNs) and multiple production activities, introducing significant complexity in the matching of
large administrative datasets and in representing statistical structures on the ABS Business
Register. The lack of the direct link between the Legal Entity and the producing unit limited the
ability of the ABS to use administrative data for units in the profiled population.

5. In 2011 a full review of the ABS Economic Units Model commenced. A critical finding of this
review was the lack of a direct link between the Legal Entity Statistical Unit (ABN) and the
Production Statistical Unit (Type of Activity Unit - TAU). The 2002 ABS Economic Units Model was
revised so that Legal Entities (ABNs) could be directly mapped to Production Units (TAUs). This
function was introduced in the 2013 ABS Economic Units Model as ‘ABN-TAU mapping’.

6. The ABN-TAU mapping functionality of the 2013 ABS Economic Units Model created
opportunities to utilise administrative data for statistical units in the profiled and non-profiled
populations. The link from the Legal Entity Unit to the Production Unit means that administrative
data can be used to derive data at the TAU level. As the TAU is the most commonly used
statistical unit in ABS economic collections, derived administrative data will improve data
coverage and provide opportunities for new statistical outputs via data linking.

7. This paper describes the changes to the ABS Economic Units Model; the implementation of ABN-
TAU mapping; and the expected opportunities from ABN-TAU mapping.

**Conceptual framework**

**2002 ABS Economic Units Model**

8. With reference to Figure 1, the 2002 ABS Economic Units Model contained the following
statistical units: Enterprise Group (EG), Enterprise (EN)\(^2\), TAU Production Unit (Type of Activity
Unit/TAU), and Legal Entity (LE/ABN). The 2002 ABS Economic Units Model was applied on the
ABS Business Register from 2002 to 2013.

\(^2\) The enterprise in the 2002 ABS Economic Units Model was defined as an institutional unit comprising a single
legal entity, or group of legal entities, within an enterprise group. This statistical unit was created to meet the
needs of the International Investment and Financial surveys. For some units in international collections,
separate entities were grouped for statistical reporting purposes to form a single enterprise provided they
were in the same institutional subsector and conformed to all data collection requirements. In SNA2008, the
enterprise is defined as the view of an institutional unit as a producer of goods and services.
9. The 2002 ABS Economic Units Model restricted the extent to which administrative data sets could be used because there was no direct link between the legal entity and the producing unit. While it was possible to impute data items for the TAU via aggregation and disaggregation, the lack of a direct ABN-TAU link introduced inaccuracy in the creation of imputation and sampling benchmarks.

Figure 1 – 2002 ABS Economic Units Model administrative data flow

2013 ABS Economic Units Model

10. The 2002 ABS Economic Units Model was reviewed in 2011, with several deficiencies identified. The 2013 ABS Economic Units Model (Figure 2) introduced the following changes:

1. A direct link between the Legal Entity (LE/ABN) and the Type of Activity Unit (TAU);
2. Removal of the Enterprise (EN); and
3. The inclusion of a Location unit.

11. The most significant change was the introduction of a direct link between the Legal Entity (LE/ABN) and the TAU Production Unit (TAU). The ABN-TAU mapping functionality enables the ABS Business Register to store relationships between Legal Entities and TAUs.

Figure 2 – 2013 ABS Economic Units Model
12. Legal Entity (ABN) administrative data can be directly matched and used to derive TAU statistical data (*Figure 3*). This will ensure the ABS Business Register is positioned to use administrative data as extensively as possible.

![Figure 3 – 2013 ABS Economic Units Model administrative data flows](image)

13. The links between the ABN and TAUs under the 2013 ABS Economic Units Model were achieved by restricting the permissible relationships between ABNs and TAUs in an Enterprise Group:

1. One Legal Entity (LE/ABN) to one TAU (*Figures 4 and 5*)
2. Many Legal Entities (LEs/ABNs) to one TAU (*Figure 6*)
3. One Legal Entity (LE/ABN) to many TAUs (*Figure 7*)

14. Under the 2013 Economic Units Model, many to many relationships are no longer permissible.

**One Legal Entity to one TAU:**

15. The one Legal Entity to one TAU mapping relationship assigns a 100 percent weighting of a Legal Entity to its respective TAU (*Figure 4*). This relationship can occur multiple times in an Enterprise Group (*Figure 5*). The ‘one to one’ mapping relationship is not complex, and appears frequently on the ABS Business Register.

![Figure 4 – One Legal Entity (ABN) to one TAU relationship](image)
Many Legal Entities to one TAU:

16. For Enterprise Groups with a ‘many Legal Entities to one TAU’ mapping relationship, a 100 percent weighting is assigned to all Legal Entities in relation to their respective TAUs. This relationship can occur multiple times in an Enterprise Group (Figure 6). The many to one mapping relationship has a relatively low level of complexity and is a common ABN-TAU configuration for Enterprise Groups in the profiled population.

One Legal Entity to many TAU:

17. The ‘one Legal Entity to many TAUs’ mapping relationship is more complex and less common. This structure occurs when one Legal Entity operates a number of production processes and a number of TAUs are created in an Enterprise Group (Figure 7). Because the Legal Entity economic activity covers more than one TAU, the Legal Entity activity is distributed across the TAUs using the weighting item. This weighting is created during profiling and is usually based on a ratio of TAU employment or income. The total of the weighting items for a particular Legal
Entity must equal 100. These weightings are used in deriving unit record administrative Legal Entity data for TAUs in the ‘one to many’ category.

Combined example:

18. Figure 8 demonstrates that an Enterprise Group can contain all possible Legal Entity (LE/ABN) to TAU mapping configurations. LE1 is mapped to TAU1 in a ‘one to one’ configuration, LE2 is mapped to TAUs 2, 3 and 4 in a ‘one to many’ configuration, and LEs 3 and 4 are mapped to TAU5 in a ‘many to one’ configuration.
Implementation

19. Implementation of ABN-TAU mapping for the 7,000 TAUs housed on the ABS Business Register involved a number of steps, including:
   1. Revising the items collected in profiling
   2. BR systems remediation to hold the ABN-TAU mapping and weighting item
   3. Training profiling staff
   4. Updating the system
   5. Undertaking audits
   6. Developing a maintenance strategy

20. The ABN–TAU mapping was captured during profiling. This included updating the mail profiling form to collect information about specific legal entities associated with each production unit within each Enterprise Group. The Business Register system was remediated to enable the mapping information to be stored and queried. This has enabled the ABN-TAU relational mapping data on the ABS Business Register.

21. Training packages were developed in the software program Camtasia so that profilers could be made aware of the changes to systems, concepts and procedures. The Camtasia software was used to produce instructional video files with voice-over explanations. Training focused on the different conceptual scenarios of ABN-TAU mapping and the required profiler action in each scenario. These videos were sent to all profilers, with follow up coaching sessions later provided as a means of enriching practical ABN-TAU mapping skills.

22. To accelerate the completion of ABN-TAU mapping for Enterprise Groups in the profiled population, a process of batch updating was deployed. This process automatically mapped Legal Entities (LEs/ABNs) to Production Units (TAUs) for single TAU Enterprise Groups. A targeted approach was used to map remaining complex Enterprise Groups. In June 2014, ABN-TAU mapping for the profiled population was 99 percent complete.

23. ABN-TAU mapping has been included into profiling quality assurance processes. A two pronged method is now used, with a combination of automated and manual audit checks. The automated quality assurance method checks that the ABN-TAU mapping field is populated and that the total percentage weighting of each Legal Entity (ABN) equals 100. A manual check observes a sample
of Enterprise Groups to ensure that the correct Legal Entities have been mapped to the correct TAU, and that the overall Legal Entity and TAU structure is accurate.

24. Audits of the ABN–TAU mappings have also been introduced as part of the quality assurance process. The quality assurance audits have confirmed that by June 2014, the majority of the ABN-TAU mappings had been correctly implemented.

**Opportunities**

25. Expected opportunities for the ABN-TAU mapping data have been discussed with users and stakeholders. The ability to use this relational data to improve imputation methods and administrative data capabilities were recurring suggestions. New administrative data sources are expected to generate further opportunities to utilise the relational ABN-TAU data, using the ABN as the linking variable.

26. The introduction of ABN-TAU mapping in the 2013 ABS Economic Units Model will indirectly improve the quality of industry classifications and National Accounting outputs. Due to ABN-TAU mapping, the production activities of all Legal Entities within an Enterprise Group are now collected to assist in identifying ABN-TAU links. This additional level of production activity detail enables profilers to fine-tune industry classifications of corresponding Production Units (TAUs).

27. ABN-TAU mapping has also proved beneficial to profilers, who are improving their understanding of complex organisational structures and the relationships between Legal Entities and Production Units. ABS survey areas are also finding that this relational data assists the understanding of statistical structures during unit record investigations.

28. The ABN-TAU mapping will replace imputation of benchmark data for the TAU statistical unit. Previously all ABN unit record data items were aggregated to the Enterprise Group level, and then disaggregated to the TAU level, resulting in loss of data integrity. The ABN-TAU relational data will be used to link the administrative Legal Entity tax data directly to the TAU statistical unit, eliminating the need to disaggregate data.

29. As of June 2014, ABN to TAU mapping has been completed for approximately 99 percent of Enterprise Groups in the ABS profiled population. ABN-TAU relational data can be output to a
table in SAS, SQL or Microsoft Excel and merged with other ABS datasets. For example, a table containing Legal Entity income and wages could be matched to Production Units (TAUs) in the construction industry. Using a simple aggregation, income and wages would be available at TAU level and it would be possible to calculate average income and wages for the construction industry. This capability has created opportunities for the ABS to make better use of existing ABS Business Register data. It has also enhanced ABS intelligence of business structures and the relationships between Legal Entities and Production Units.

Conclusions

30. The inclusion of ABN-TAU mapping on the ABS Business Register was the most significant change introduced in the 2013 ABS Economic Units Model. This change has enabled the ABS Business Register to optimise its administrative data capabilities and has allowed existing data to be used in new ways. As a result of these changes the potential to use the ABS Business Register as a more integrated ABS system has become very real.

31. The implementation of ABN-TAU mapping has also introduced a new element into profiling practice. Profilers must now investigate and interpret the relationship between Legal Entities and Production Units in each Enterprise Group. In addition, it has strengthened the profiler understanding of organisational structures. This relational data also assists the ABS survey areas to understand organisational structures and how statistical units fit into the legal structure of an Enterprise Group.

32. The relationship between the Legal Entity and Production Unit is a concept that has enhanced the ABS Business Register and introduced a number of experimental opportunities. In an increasingly constrained budgetary environment, the ABN-TAU function aligns the ABS Business Register to adapt to change and integrate new administrative data sources at relatively low cost. This will create the agility to reduce provider burden while exploring new capabilities and new outputs.