

# Centre for Transformative Innovation

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## Analysis of Austrade Export Market Development Grants, 2012-17

A Report prepared for  
Australian Government  
Australian Trade and Investment Commission

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February 2020

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## **Executive Summary**

### Introduction

In October 2019, The Australian Trade and Investment Commission (Austrade) engaged the Centre for Transformative Innovation, at Swinburne University of Technology in partnership with the Australian Bureau of Statistics (ABS) to primarily evaluate the impact of the Export Market Development Grants (EMDG) scheme, with a secondary goal of evaluating the impact of the EDMG scheme when combined with Austrade's tailored services.

The EDMG scheme is designed to assist small and medium enterprises (SMEs) develop their export market by reimbursing up to 50 per cent of eligible export promotion expenses.

This evaluation links EDMG participants via their Australian Business Number (ABN) with the ABS Business Longitudinal Analytical Data Environment (BLADE). BLADE includes objective data on business performance from the Australian Tax Office (ATO) Business Activity Statement (BAS) and Business Income Tax (BIT) records.

The evaluation comprises 4,696 organisations receiving EDMGs and a further 657 organisations receiving both EDMGs and tailored services from Austrade over the period beginning 1 July 2012 through 30 June 2017. This sample was selected based on the availability of sufficient information on business performance characteristics in BLADE database. These organisations represent the two treatment groups detailed in the report.

For the evaluation, we employed a robust quasi-experimental method known as matched difference-in-differences (DID) analysis. This method has been shown to be robust even when only observational data are available and the observed program participation is subject to systematic selection on unobservable factors. The method compares the change in export and employment performance before and after program participation of the organisations receiving EDMGs to the change in the performance of matched/similar firms. The treatment group is compared to organisations drawn from a pool of 5,509 organisations which have received general information and advice on exporting from Austrade, but no other Austrade service. The selected group is known as the control group. Their performance is assumed to be the counterfactual scenario of firms that did not receive an EDMG grant but were export active. To be included in the study, firms in the control group had to be actively trading in the 2011-12 financial year to provide sufficient financial information to compare the before and after growth for the treatment groups.

## Key Findings

Organisations receiving EMDGs experience positive and significant (statistically and in terms of magnitude) improvements to their firm performance compared to control groups matched on turnover, export participation, imports, employment and age. The estimates from our models are robust to how the control groups are defined. The key findings are:

### *Key finding 1*

- Export sales are 157 to 164 per cent higher in the financial years subsequent to a qualifying EMDG when compared to the counterfactual of not obtaining a qualifying expenditure. This equates to \$716,000 to \$748,000 per annum per firm.
- Organisations having qualifying EMDG expenditures in addition to obtaining tailored services had export sales increase 190 to 217 per cent, equating to an additional \$2,157,000 and \$2,464,000 in annual export sales per firm.
- The above estimates translate into an additional \$4.8 to \$5.1 billion in annual exports in the absence of the EMDG scheme.
- Organisations receiving EMDGs experienced a long-run increase in employment of 8.6 to 11.2 per cent and 16.1 to 20.1 per cent increase in employment for firms receiving both EMDGs and Tailored Services. This equates to 2.5 to 3.2 jobs per business for the EMDG scheme and 12.6 to 15.8 jobs per business for the EMDG scheme combined with tailored services.

### *Key finding 2*

- An EMDG is associated with a 5.4 to 7.5 percentage point increase in the probability that an organisation remained economically active between the 2013 and 2017 financial years when compared to the survival rates of the control group.
- Organisations receiving an EMDG were found to be 9.0 to 11.6 percentage points more likely to be exporting by the end of the 2016-17 due to their inclusion in the EMDG scheme.

### *Key finding 3*

- Firms in the resource and manufacturing sectors experienced the largest increase in exports. On average, firms in the resource sector increased exports by 196 to 202 per cent after the year of their overseas expenditures, whereas manufacturing firms experienced 218 to 224 per cent increase in

export sales. Service sector organisations saw export sales increases between 133 and 137 per cent the years after qualifying EMDG expenditures.

- Smaller firms benefited most from the EMDG scheme. Firms with turnover under \$250,000 prior to their first qualifying EMDG expenditure experienced 227 to 239 per cent increase in export sales, whereas this growth fell as firms turnover increased. There is limited evidence that firms with turnover exceeding \$10 million benefitted from the EMDG scheme.

## 1. Introduction

### 1.1 Objective, scope and deliverables

The key objective of this evaluation study is to assess the impact of Australian Trade and Investment Commission (Austrade)'s Export Market Development Grant (EMDG) scheme on firms' export revenue, employment, and survivability. The impact covers successful organisations which had eligible expenses during the period from 1 July 2012 through 30 June 2017.

We, the Centre for Transformative Innovation (CTI) at Swinburne University of Technology in partnership with the Australian Bureau of Statistics (ABS), developed a framework to assess the impact of EMDGs based on detailed microdata obtained from linking EMDGs as well as the Austrade tailored and general services participation database to the ABS's Business Longitudinal Analytical Data Environment (BLADE).

In the report, we utilise difference-in-differences analysis with several control groups, with and without matching on turnover, export participation, imports, employment, industry, state of headquarters, and age, in order to assess the significance of any selection bias in the impact estimates. For example, we consider both unmatched and matched firms receiving general services and no other service from Austrade as the control group.

The study exploits linked business-level records between two Australian Trade and Investment Commission databases to the Australian Bureau of Statistics (ABS) Business Longitudinal Analysis Data Environment (BLADE). Austrade provided program participation data from both its Relationship Management System (RMS) as well as its EMDG administrative database. The linked Austrade participation data and BLADE provide objective information on sales, employment, exports and assets of both participants and non-participants collected from business taxation records. The objective nature of the information is critical for obtaining robust and unbiased estimates of the effects. The BLADE BAS and BIT data held by the ABS are brought into the ABS under the Census and Statistics Act 1905 and are subject to the same confidentiality requirements as directly collected ABS data.

The BLADE data used for the current study is based on a consolidated ABS business unit that takes into account two different scenarios<sup>1</sup>:

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<sup>1</sup> Within BLADE, a business unit is defined as a Type of Activity Unit (TAU). This is to be contrasted with the definition of unit within the Austrade program which is based on the Australian Business Number (ABN). In theory, the consolidated business unit more accurately measures business performance and hence provides a more accurate estimate of the impact of the tailored services. Due to simultaneous combining and splitting of ABNs to Type of Activity Units as well as non-matches, the number of firms obtaining tailored services represented in BLADE may not match the number of firms found in the Austrade administrative database.

1. Multiple ABNs belonging to the same business activity.
2. Single ABNs that need to be apportioned over several business activity units for the underlying Business Activity Statement and Business Income Tax measures that we used in the analysis.

The scope of the current report covers an impact evaluation for organisations receiving EMDGs and obtaining tailored services from Austrade. The outcome variables in this report are export sales, export participation, export intensity, employment, labour productivity, capital productivity, survival status, and export survival period. Investigation on the possible causes of or channels that lead to the lack or presence or magnitude of the impact is outside the scope of the study.

This evaluation is amongst the early attempts in Australia to evaluate the impact of a government programs using large-scale administrative data. Access to previously unavailable unit record tax information within BLADE within an interactive environment represents a unique opportunity to further refine and improve existing government services.

## 2. Austrade Programs

### 2.1 Export Market Development Grants

Austrade provides the Export Market Development Grant (EMDG) scheme as an export incentive to SMEs to begin or expand their export markets. The scheme allows organisations to be reimbursed as much as 50 per cent of eligible expenses which are related to export promotion. To be eligible, qualifying expenses must be at least \$5,000 with organisations spending at minimum \$15,000 in total expenses. The maximum value of the grant after 2<sup>nd</sup> tranche adjustments is \$150,000.<sup>2</sup>

The general criteria to qualifying for a grant:

- Turnover not exceeding \$50 million
- Own the good or service that is being promoted
- The good or service is produced in Australia or benefits Australia, or the export service (i.e. tourist services) is delivered in Australia<sup>3</sup>, and
- Had received no more than eight EMDGs previously.

Expenses from eight categories of promotional activity are allowed:

- Overseas representatives
- Marketing consultants
- Marketing visits
- Free samples
- Trade fairs, seminars and in-store promotions
- Promotional literature and advertising
- Overseas buyers, and
- IP registration and related insurance.

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<sup>2</sup> Initial payments are capped under \$150,000 in order to ensure a more even distribution of funding for firms. The capped amount is announced at the beginning of each financial year. Any remaining funds after the first tranche is distributed are distributed on a pro-rata basis.

<sup>3</sup> Goods produced overseas can receive EMDG grant, so long that there is a benefit to Australia. Section 24B of the EMDG Act applies to providing assistance to firms that manufacture goods that are “not made in Australia”. It recognises that many Australian manufacturers increasingly have their final manufacturing and assembly stages carried out overseas, while carrying out their design, research and development and other “knowledge’ activities in Australia.



## **2.2 Austrade Tailored Services**

In contrast to the EMDG scheme, the Austrade tailored services program is not a direct export incentive program. It is an export facilitation program to help Australian organisations that either begin exporting or expanding their export markets in new markets. This support can be as simple as business intelligence research such as providing data on market trends. It can also involve more complex activity such as developing overseas partnerships and facilitating offshore trade missions. Austrade provides these services at a uniform fee of A\$275 per hour.

Tailored services offered by Austrade are categorised into five general areas<sup>4</sup>:

- Market or country research which will help with specific exporting issues including gathering data on market trends, identifying market barriers and regulations, assessing market potential or gathering information and advice on the suitability of a product or service.
- Potential partner and customer identification which will help with identifying local contacts in international markets to assist with importing, distributing and supporting Australian products or services in the foreign market.
- Creating appointments during market visits with potential partners or customers that will maximise the value of Australian firms when overseas.
- Following-up initial introductions which Austrade uses to gather information from potential customers or partners on their assessment of the Australian organisations product or service.
- Market promotions which allow organisations to travel overseas that can facilitate introductions to new partners or customers.

## **2.3 Austrade General Services**

Austrade also provides organisations with general export facilitation services such as market tips for exporting and how to do business in the international market. These services can include general market briefings, cultural tips on conducting overseas business, information on local practices and requirements, referrals to specialist business services, strategic advice, and assistance for setting up a business in an international market.

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<sup>4</sup> Compiled from <https://www.austrade.gov.au/Australian/How-Austrade-can-help/trade-services>

## 2.4 Austrade Program Participants in 2012-13 – 2016-17

This evaluation utilises the Austrade’s administrative data for both EMDG grant recipients and tailored and general service participants and the BLADE database. The Austrade databases provides participant-level details of the participating organisations from 1 July 2012 through 30 June 2017. Specifically, the database contains:

- Organisation names and ABNs
- Financial year of participation
- Program Type: EMDG Grant, Tailored Service or General Service

In addition, we have a database of all past participants in EMDG schemes from 1976. The database contains the financial year of grant payment as well as the ACN or ABN of the entity receiving a grant.

Table 2.1 presents the number of unique recipients of the EMDG scheme as well as the number of unique recipients which received both an EMDG as well as tailored services from Austrade during the study period. The table is broken down first by the number of program participants by major sector. The second column is the subset of firms used in the analysis as they had sufficient financial information to be used in the matching regressions.<sup>5</sup>

Based on the administrative data from Austrade that was linked to BLADE, 7,682 unique organisations at the ABN-level have had qualifying expenses that were reimbursed via EMDG scheme between 2012-13 and 2016-17 financial years. For those firms, 5,355 were used in the analysis. The remaining were excluded due to missing financial information in BLADE. This represents 69.7 per cent of firms in BLADE that received an EMDG.

Most organisations receiving EMDGs were in the service sector. During the period of study, 6,124 organisations (or 79.7 per cent) were from the service sector. The respective numbers for manufacturing and resources were 1191 (15.5 per cent) and 237 (3.1 per cent) respectively. The remaining were unclassified in ANZSIC. For firms with non-missing financials, the distribution is largely unchanged.

The administrative data shows that 732 firms or 9.5 per cent of firms received tailored services in addition to an EMDG. Of those, 536 were in the service sectors, 44 in resource sectors, and 145 within manufacturing.

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<sup>5</sup> See Appendix 2 for information regarding the financial information used in the matching step.

**Table 2.1 Number of unique program participants between 2012-13 and 2016-17.**

<b>Austrade Participants</b>	<b>Treatment</b>		<b>Control* (General Services)</b>
	<b>All Firms</b>	<b>Available Financial</b>	
EMDG Only	6,950	4,696	<b>3,336</b>
EMDG + Tailored Services	732	659	
<b>Total</b>	<b>7,682</b>	<b>5,355</b>	
<b>...in Resources</b>			
EMDG Only	193	157	<b>460</b>
EMDG + Tailored Services	44	35	
<b>Total</b>	<b>237</b>	<b>192</b>	
<b>...in Manufacturing</b>			
EMDG Only	1,046	781	<b>698</b>
EMDG + Tailored Services	145	134	
<b>Total</b>	<b>1,191</b>	<b>915</b>	
<b>...in Services</b>			
EMDG Only	5,588	3,752	<b>2,174</b>
EMDG + Tailored Services	536	490	
<b>Total</b>	<b>6,124</b>	<b>4,242</b>	

Source: Computed based on Austrade administrative data merged by ABN to BLADE which had sufficient financial information to be included in the analysis.

Notes: The number of organisations used in the final analysis may differ slightly as not all treatment firms had a matched control firm. Of the firms receiving tailored services, only those which also had qualifying EMDG are included in this report. Available Financial are the subset of firms in BLADE which have sufficient financial information within BAS and BIT to match to a potential firm in the control group. Breakdown by sector does not equal the overall total as some firms remain unclassified by ANZSIC in BLADE. \* matched on turnover, export participation, imports, employment, industry, state of headquarters, and age.

To evaluate the impact of the EMDG scheme as well as the joint impact of tailored services and EMDGs, we use a control group that is based on organisations that have received general services from Austrade, but no other service. This includes both current and historical EMDGs as well as tailored services. Within the linked dataset, 5,509 organisations have received general services, but no other services from Austrade. Within that set, 3,336 are potentially available to be in the control group based on the availability of financial data.

### 3. Evaluation method and data

#### 3.1 Difference-in-differences analysis with matching

We implement a difference-in-differences (DID) analysis with a further refinement that the control group is selected by matching the economic characteristics of participant and non-participants. The basic premise is to compare the pre-service business performance of participants. We normalise this change in participants' performance by comparing it to the change in performance of non-participants. In this manner, we compare any participating firm's performance to a simulated situation in which they had not participated (that is, if they had not received an EMDG).

We separately explore two treatment groups:

- Firms only with qualifying EMDG expenditures
- Firms with both qualifying EMDG expenditures and receiving a tailored service

In the first case, we consider firms to have been treated in the financial year that they had a qualifying EMDG expenditure.<sup>6</sup> In the second case, we consider a firm to be treated in the first financial year in which they either had a qualifying EMDG expenditure or received tailored services from Austrade.

As firms who use Austrade services are not randomly selected, it is not feasible to obtain an unbiased estimate of the true change in firm performance by comparing the results to a random selection of firms not using services. To reduce the possibility of any selection bias, a control group needs to be constructed using observed characteristics of non-participating firms that is as closely matched to the characteristics of participating firms as possible prior to accessing Austrade tailored services. We use two pools of firms as potential control groups. The first group are firms who have received general services from Austrade but had not subsequently engaged with Austrade for tailored services or received an EMDG in the period prior to the 2012-13 financial year. The second control group is based on the pool of all economically active firms in Australia.<sup>7</sup> The first pool is our preferred comparison group as these firms accessing general services from Austrade signal a potential willingness to export or expand their goods and services. This signal is otherwise not fully captured in the pool of all economically active firms. Both pools are compared unmatched and matched on turnover, export participation, imports, employment and age.

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<sup>6</sup> And not when they were reimbursed via the EMDG scheme.

<sup>7</sup> Economically active firms are defined as firms which have sales turnover or a non-zero headcount in a given fiscal year. This is similar to the ABS definition used in the Business Characteristics Survey which defines economically active firms as those that have a registered ABN and an active tax role.

We consider several measures of performance: Export Sales, Export Participation, Employment, Export Intensity, Survival and Export Survival.

### 3.2 Data

To obtain unbiased estimates of the impacts of EMDGs, we need business performance data on organisations receiving EMDGs as well as those seeking tailored and general services. This allows us to explore the outcomes of organisations receiving Austrade support compared the control group. To construct the above measures, we use business performance measures available from Business Activity Statement (BAS), Business Income Tax (BIT) and Pay as You Go (PAYG) modules within the Australian Bureau of Statistics' Business Longitudinal Analytical Data Environment (BLADE). The BAS component contains annualised statements provided by organisations with Australian Business Numbers (ABN) in Australia since 2001-02 to comply with their GST obligations.

BLADE provides several indicators of business performance derived from BAS such as value of exports of goods and services from Australia that are GST-free; and sales and turnover for more than 2 million active businesses in Australia based on linked administrative databases such as the Australian Taxation Office (BIT and BAS), ABS Business Characteristics Survey database and the IP Australia intellectual property rights protection data. Sales and turnover information are particularly valuable for small firms that are heavily reliant on export revenues.

For the evaluation, the identified GST-free export sales<sup>8</sup> from the Business Activities Statements (BAS) is the most direct measure of export performance.<sup>9</sup> Exported goods are GST-free if they are exported from Australia within 60 days of one of the following, whichever occurs first: the supplier receives payment for the goods and services or the supplier issues an invoice for the goods and services. Other exports generally include supplies of things other than goods or real property for consumption outside Australia, such as services, various rights, recreational boats, financial supplies and other professional services.

The data also provides good coverage for a large class of service exports. Generally, a supply of a services is GST-free if the recipient of the service is outside Australia and the use of the service is outside Australia. Examples include any consultancy services, contract research or business services undertaken in Australia, but paid for by an overseas company. Exceptions include health, tourism and education services consumed in

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<sup>8</sup> GST-free means the business does not include GST in the price of its product or service. The business can also claim credits for the GST included in the price of purchases it used to make its GST-free sales.

<sup>9</sup> The Business Income Tax (BIT) component of BLADE also includes net foreign income. However, the measurement mixes both sales and investment income which makes it more difficult to disentangle how much the net foreign income represents export performance. Due to this complication, we do not use net foreign income for this evaluation.

Australia.<sup>10</sup> Although these services can be GST-free, they would be recorded in those in cases as “Other GST-Free Sales” or if they charge GST, would not be included in the BAS database under export sales.

In summary, export sales on the BAS statement for services include:

- The free on-board value of exported goods that meet the GST-free export rules such as consulting services
- Payments for the repairs of goods from overseas that are to be exported, and
- Payments for goods used in the repair of goods from overseas that are to be exported

Export Sales in the BAS statement does not include:

- Amounts for GST-free services (such as health and education) unless they relate to the repair, renovation, modification or treatment of goods from overseas whose destination is outside Australia
- Amounts for freight and insurance for transport of the goods outside Australia, or other charges imposed outside Australia in the free on-board value
- Amounts for international transport of goods or international transport of passengers.

The points above suggest that the measured export sales for the service sector can be underestimated relative to measured goods export sales.<sup>11</sup> However, the fact that the service export sales is underestimated does not necessarily mean that the impact of EMDGs is underestimated. If the extent of underestimation remains constant before and after receiving EMDGs or does not vary by participation in the services, the evaluation will still produce unbiased estimates (especially when expressed as a relative change) of the program impact.

As discussed earlier, the BAS component of the BLADE dataset contains information from all tax records provided by businesses with ABNs within Australia. However, firms and organisations can use one or multiple ABNs to conduct business across multiple industries. To standardise their analysis, the ABS uses an “Economic Units Model” that attempts to classify organisations across several “type of activity units” (TAUs).<sup>12</sup> This model is both complicated and confidential. Situations can arise where financial data from several ABNs are aggregated into one TAU as well as cases where the economic activity in one ABN is split across several TAUs.

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<sup>10</sup> These sectors are still included in the current analysis, but with health and education services, we use an outcome measure for sales that includes sales from other GST-free services.

<sup>11</sup> Recently, merchandise export and import data provided by the Department of Home Affairs has been made available, but they will underestimate exports of services.

<sup>12</sup> A Type of Activity Unit attempts to be homogenous within a two-digit ANZSIC subdivision.

This relationship is not publicly available to researchers outside of the ABS and can result in differences in the number of organisations in summary statistics between the administrative data and BLADE.<sup>13</sup>

We merge the Austrade administration data for both tailored and general service participation into BLADE's business records. When comparing the treated firms to the remaining set of Australian firms, we exclude businesses with no sales revenues, business income, total expenses, or salary and wage expenses as well as those missing values in any of the matching variables. We refer to this set of firms as those that are economically active.

The match rate from the administration data for the EMDG was very high. Approximately 96.5% of the 7,875 unique ABNs identified in the Austrade EMDG program dataset, or 7,600 ABNs, were mapped onto 7,682 type of activity units within BLADE.<sup>14</sup>

Table 3.1 presents the mean of the average pre-treatment characteristics of organisations in the program database. For the EMDG recipients and organisations receiving tailored services, the pre-treatment characteristics range from the first year they appear in BLADE until the financial year prior to their first entry in the program database. For general services, the pre-treatment characteristics are averaged between 2001-02 (or their first financial year in BLADE) and 2011-12. As seen in the summary statistics presented in the table, EMDG Only recipients are typically smaller than those organisations receiving both an EMDG and tailored services both in terms of export sales and employment. While around two-thirds of EMDG only organisations had exports prior to the financial year of qualifying EMDG expenditures, over 85 per cent of organisations of EMDG + Tailored Services organisations were exporting prior to their first service with Austrade.

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<sup>13</sup> A more detailed explanation of the Economic Units model can be found in Appendix 1 of the "Australian Bureau of Statistics Business Register, <http://www.abs.gov.au/ausstats/abs@.nsf/dossbytitle/AC79D33ED6045E88CA25706E0074E77A?OpenDocument>

<sup>14</sup> The exact number is approximate as match rates were provided only for the combined EMDG, tailored service and general service database.

**Table 3.1: Number of organisations and mean of average pre-treatment firm characteristics**

	EMDG Only		EMDG + TS	
	Treated (Matched*)	Control (Matched* General Services)	Treated (Matched*)	Control (Matched* General Services)
N	4,686	1,774	657	483
Export Sales	456,259	631,809	1,135,504	1,348,851
Export Participation	0.6793	0.6268	0.8524	0.8467
Employment	28.5	35.5	78.4	77.5

Source: Computed based on merged Austrade administrative database and cleaned version of BAS database in the BLADE.

Note: \*The matched sample is based on the one nearest neighbour match using the specification described in Section 3.2. The match is based on turnover, export participation, imports, employment, industry, state of headquarters, and age. Further summary statistics are available in the appendix.



When comparing the treated organisations to their matched control group, we see that the respective Matched General Services organisations had larger average export sales (\$631,809) and employment (35.5), but were slightly less likely to export (0.6268) when compared the EMDG Only treatment group (with corresponding averages of \$456,259, 28.5 and 0.6793). These differences are statistically significant, indicating that the matching process using observable characteristics have not eliminated any pre-treatment differentials between the treated and control group. However, it should be noted that the pre-treatment bias seems to “favour” the control group in terms of export sales and employment. Furthermore, the lower half figures in Table 3.1 show that the pre-treatment differences between the general service control group and the EMDG + Tailored Service treatment group are not statistically significant, indicating that the matching process eliminated any pre-treatment differentials. More detail discussions on the results of the matching process can be found in the Appendix 2.

Table 3.2 shows the breakdown of the average pre-treatment characteristics of the matched treated firms over the subsamples used in the regression analysis to be presented in Section 5. The summarised pre-treatment characteristics suggest that the manufacturing firms receiving an EMDG are typically more export focussed than resource and service firms. Moreover, firms with an EMDG and further receiving tailored services are larger than those firms receiving only an EMDG. The average of export sales, export participation and employment over the distribution of pre-treatment turnover is as predicted. It is interesting to note though that within each of these bands, firms receiving both an EMDG and tailored services are more export focused. For example, only 48 per cent of firms in the smallest turnover band (\$0 - \$250,000) were exporting prior to treatment, over 63 per cent of those receiving both an EMDG and tailored services were exporting. For those firms that were exporting, the value of exports were also higher for the latter group. These results remained consistent across the nine turnover bands.

**Table 3.2: Mean of average pre-treatment firm characteristics by subsample Participation**

Subsample	EMDG-Only Recipients				EMDG + TS Recipients			
	N	Export Sales	Export Participation	Employment	N	Export Sales	Export Participation	Employment
Overall	4,686	456,259	0.6793	28.5	657	1,135,504	0.8524	78.4
Resources	154	570,079	0.6558	24.9	34	1,398,616	0.8824	42.4
Manufacturing	781	659,259	0.8156	27.0	134	882,572	0.9254	44.0
Services	3,731	410,120	0.6510	29.0	488	995,388	0.8299	88.9
\$0 - \$250k	1,035	22,303	0.4783	4.0	65	47,317	0.6308	4.5
\$250k - \$500k	621	66,749	0.6538	6.0	47	107,413	0.8085	5.7
\$500k - \$750k	409	113,213	0.6968	8.9	54	129,833	0.8889	9.8
\$750k - \$1m	300	157,079	0.7200	10.8	34	231,810	0.8529	10.1
\$1m - \$2.5m	931	260,502	0.7186	17.2	133	418,072	0.8797	18.1
\$2.5m - \$5m	536	568,217	0.7612	31.2	109	650,648	0.8532	38.9
\$5m - \$10m	370	1,051,278	0.8405	49.7	96	1,244,604	0.8854	57.6
\$10m - \$20m	207	2,403,932	0.8357	88.0	43	2,087,662	0.9302	109.6
\$20m - \$50m	73	4,072,961	0.8493	136.3	25	6,376,039	0.9200	115.0

Source: Computed based on merged Austrade administrative database and cleaned version of BAS database in the BLADE.

Notes: The matched sample is based on the one nearest neighbour match using the specification described in Section 3.2. Turnover bands are based on average pre-treatment real turnover in 2002 dollars.

#### 4. Literature Review

The theoretical and international business literature has argued that firms may face significant barriers to begin trading abroad and thus need to have appropriate foreign market entry strategy. Johanson and Vahlne (1972) suggest that firms tend to gradually increase their international involvement through several steps. They may begin exporting through an agent, then developing a subsidiary, before ultimately building production in the foreign country. Johanson and Vahlne (2009) follow up with a note that intensification in internationalization can be developed or hindered by the networks available within firms. International trade is initiated less by an open market trade of goods and services, but rather through a network of contacts and information that has been accumulated through experience. As noted by Rangan (2000), search and deliberation are costs that are challenging in international trade due to the presence of physical or cultural borders which increase the transaction costs when compared to trading within a country. Rauch (1996) further observes that the first firm within an industry to begin exporting to a foreign buyer has the risk of free-riding by other firms within the industry. This can create disincentives to be the first business to enter the foreign market.

Government trade promotion activities such as Austrade have attempted to lower these search and deliberation costs to export through two main methods. The first method is a process to introduce a firm to the agencies or national embassies international network of firms and contacts either through direct meetings or trade fairs. They can provide services that assist firms in understanding the complexities of international trade. These processes may be more direct such as providing firms market research, introducing firms to customers through a direct network or participation in international trade fairs. The second method is less direct through the subsidy of costs borne by the firm to engage in the search for international customers. Austrade engages in both areas, the more direct methods typically falling within the tailored services, while the EMDG scheme is an indirect subsidy to the search costs of international trade.

Export promotion programs are common across many countries as a mode in which to provide support services to firms looking to begin exporting. Volpe Martincus and Carballo (2008) is one of the earlier papers using a firm-level difference-in-differences method to evaluate government export promotion programs. They evaluated PROMPEX, a program in Peru aimed at directly assisting firms with market information and current opportunities to contact foreign suppliers or buyers. They find evidence to support that export promotions are an effective strategy in increasing the extensive margin of exports (i.e. number of destinations and/or products), yet found limited evidence that these programs were effective in increasing the value of exports per product or per country destination.

Volpe Martincus and Carballo (2010) followed their previous study by evaluating the services provided by PROCHILE, the trade promotion agency in Chile. Although they again employed a difference-in-differences

approach, they explored the impact across the quantile distribution of the outcome. The results suggest that PROCHILE was most effective in assisting firms which had lower starting levels of exports. Unlike the results for Peru, they found that the intensive margins for firms were also improved, but that this assistance again helped firms that were not exporting intensively compared to other firms.

Whereas a number of recent papers such as Volpe Martincus, Carballo and Garcia (2012), Durmusoglu, Apfelthaler, Nayir, Alvarez, and Mughan (2012); Miocevic (2013), Cadot, Fernandes, Gourdon and Mattoo (2015) have explored the impact of export promotion programs in developing and transition economies at the firm-level, the literature until recently for developed economies is scarce.

The major exceptions are recent papers by Brooks and Van Biesebroeck (2017) as well as Munch and Schaur (2018) which measures the impact of trade promotion activities in Belgium and Denmark, respectively. These papers are also useful as a benchmark as both closely match the design of this EMDG report due to their access to population firm characteristics and their use of a benchmark control group based on firms which have shown a degree of interest in exporting but had not sought formal assistance in market research or trade support.

Brooks and Van Biesebroeck (2017) use data from the *Flanders Investment & Trade* (FIT), an agency tasked to help firms with their first sale abroad. They compare firms which had received some level of support either through a direct action or subsidy from FIT and compared those firms against firms selected from a pool which had received only minimal support, receiving an answer to a question that the firm submitted to FIT. Their outcomes focused on market entrance. Their primary results suggest that support from the FIT was associated with an 8 percentage point increase in a firm's probability to export outside of the European Union. These results note that subsidies rather than "actions" performed by FIT were more beneficial. Further, they noted that a subsidy of one euro was associated with an additional average of 16 to 29 euros in export revenue over the following two years.

Similar to the previous work, Munch and Schaur (2018) merges the export-promotion services provided by the Trade Council of Denmark with financial data provided by the Statistics Denmark. The program assistance fell largely under trade promotion activities which were offered as a service to Danish firms. They do not have a baseline group of firms for controls but employ a robust set of controls from a matched employee-employer dataset. One unique aspect however, is that the Trade Council proactively contacted firms to assist with trade promotion activities. They found that two years after receiving trade support, firms were 6 percentage points more likely to export, experienced 6 per cent increase in exports, but saw no change in employment levels as a result of the trade promotion activities. Overall, they suggest that particularly for small firms, the gain in value added for firms is nearly three times higher than the direct costs of the trade promotion programs.

## 5. Results

### 5.1 Primary Results

For both sets of treatment groups, EMDG Only and EMDG + Tailored Services (EMDG + TS), we used three difference-in-differences models which varied the control group to estimate the impact of the Austrade programs. The EMDG Only treatment contains only the firms that had qualifying EMDG expenditures no earlier than the 2012-13 financial year and excludes those receiving any other treatment from Austrade, while the EMDG + TS treatment contains only those firms that received both an EMDG and tailored services from Austrade.

All control groups were based on organisations which received general services, but have not received any other service or grant from Austrade. In the first model, we did not perform any matching, thus all firms receiving general services and no other Austrade service were used as the control group. We further created a matched control group from the pool of organisations based on nearest-neighbour propensity score matching. Organisations in the control group are allowed to be matched to multiple treated organisations. To assess the sensitivity of our results, we matched both on the nearest neighbour and five nearest neighbours respectively based on firm turnover, export participation, imports, employment, industry, state of headquarters, and age. In general, the difference in means are statistically closer in the one nearest neighbour matching, thus they are our preferred results.<sup>15</sup>

Table 5.1 summarises the estimated cumulative impacts for each of outcome measures and the models. In this table, we define the treatment for the EMDG Only firms beginning on the first and every subsequent financial year after an organisation had a qualifying expenditure within the EMDG scheme. For the EMDG + TS treatment, we define a firm as treated beginning on the first financial year in which they either had a qualifying EMDG expenditure or received a tailored service from Austrade. In both cases, we refer to these results as the Cumulative Impact defined as the change in the outcome variable comparing the first and subsequent fiscal years that a firm had qualifying EMDG expenditures to the fiscal years prior to their EMDG qualifying expenditures. Thus the cumulative impact estimates are not annual increases, but rather the per cent increase of the average annual value of export sales (or other outcome) after the EMDG expenditures when compared to the average annual export sales prior to the EMDG expenditures. The cumulative impact can thus be visualised as a step increase. Furthermore, since we are including a control group which did not receive an EMDG or tailored service, these results are above any growth that the treated firms would have in the absence of these programs.<sup>16</sup>

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<sup>15</sup> The t-tests for pre-treatment means are shown in Table A2.2.

<sup>16</sup> The growth rate for the control and treated group is captured within the year fixed effects included in the second step of the analysis after matching and is not provided in this report.

**Table 5.1: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
No Matching	<b>163.6*</b>	155.3	172.0	<b>189.7*</b>	171.7	207.7
1NN Matching	<b>156.8*</b>	146.0	167.6	<b>190.0*</b>	163.2	216.8
5NN Matching	<b>157.2*</b>	147.6	166.9	<b>217.3*</b>	195.4	239.1
<b>Export Participation (% Points)</b>						
No Matching	<b>18.8*</b>	17.2	20.3	<b>24.3*</b>	20.4	28.2
1NN Matching	<b>18.1*</b>	16.2	19.9	<b>26.6*</b>	22.1	31.2
5NN Matching	<b>18.7*</b>	17.0	20.5	<b>31.4*</b>	27.2	35.5
<b>Export Intensity (Share Sales)</b>						
No Matching	14.3	-38.1	66.7	-4.2	-152.9	144.6
1NN Matching	45.3	-26.1	116.7	-178.9	-344.8	-13.1
5NN Matching	13.9	-50.5	78.3	-10.5	-245.0	224.0
<b>Employment (%)</b>						
No Matching	<b>10.7*</b>	9.2	12.3	<b>19.3*</b>	16.1	22.5
1NN Matching	<b>8.6*</b>	6.9	10.4	<b>16.1*</b>	12.2	20.1
5NN Matching	<b>11.2*</b>	9.6	12.8	<b>20.1*</b>	16.8	23.3
<b>Labour Productivity (%)</b>						
No Matching	1.8	-1.2	4.9	4.1	-2.2	10.3
1NN Matching	2.3	-1.2	5.8	2.6	-5.1	10.3
5NN Matching	2.1	-1.1	5.2	3.9	-2.5	10.2
<b>Capital Productivity (%)</b>						
No Matching	<b>9.9*</b>	3.8	15.9	2.7	-10.9	16.3
1NN Matching	<b>10.3*</b>	3.3	17.3	<b>25.9*</b>	8.7	43.1
5NN Matching	<b>11.2*</b>	4.7	17.7	5.5	-8.8	19.8
<b>Survival Probability (% points)</b>						
No Matching	<b>7.5*</b>	6.5	8.5	<b>20.7*</b>	15.5	25.9
1NN Matching	<b>5.4*</b>	4.3	6.5	<b>6.7*</b>	3.9	9.6
5NN Matching	<b>6.1*</b>	5.1	7.2	<b>11.1*</b>	7.4	14.7
<b>Export Survival (% points)</b>						
No Matching	<b>9.0*</b>	8.4	9.6	<b>12.6*</b>	11.8	13.4
1NN Matching	<b>11.6*</b>	10.8	12.3	<b>12.3*</b>	11.0	13.5
5NN Matching	<b>10.5*</b>	9.9	11.1	<b>12.4*</b>	11.6	13.3

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. “No Matching” uses all firms seeking general services, excluding those also receiving any other Austrade service. “1NN Matching” uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while “5NN Matching” uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. The match is based on turnover, export participation, imports, employment, industry, state of headquarters, and age.

Table 5.1 shows that when compared to the general services control group, Austrade EMDGs provide a significant boost to export sales. The three models suggest the average increase ranges between 157 and 164 per cent of pre-treatment export sales. Each of these estimates are statistically significant. However, our preferred model is more conservative with the 95 per cent confidence interval ranging between 146 and 168 per cent. To put this amount in perspective for the 1NN model and based on the average pre-treatment export sales of \$456,259, the EMDG scheme is estimated to increase export sales an additional \$715,414 higher per firm per year on average than in the absence of the EMDG scheme.

The estimated impact of the 1NN matching for the joint EMDG + TS model is slightly higher with an estimated impact for the 95 per cent confidence interval of the preferred model (1NN) ranging between 163 and 217 per cent per year. The average estimated impact across the three specifications are close, ranging between 190 and 217 per cent. However, the average pre-treatment export sales at \$1,135,504 are higher for firms receiving both an EMDG and tailored services and thus this would translate for the 1NN model at an additional \$2,157,457 export sales on average per year per firm. However, as the confidence interval for the impacts between EMDG Only and EMDG and tailored services overlap, we cannot reject the hypothesis that the impacts are the same. Thus we should be cautious when interpreting the difference between the average effects as evidence for additionality between EMDGs and Tailored Services.

The next outcome of interest is export participation. This measures the probability that a firm will enter the export market. Export participation is defined as any firm which has positive exports in the BAS statements.<sup>17</sup> The estimates between the three models for the EMDG only results vary slightly and suggest that the EMDG scheme increased export participation on average between 18.1 and 18.8 percentage points with the 95 per cent confidence interval ranging between 16.2 and 20.5 percentage points. The summary statistics in Table A2.2 suggest that nearly 68 per cent of firms had exported in the financial years prior to their EMDG application, the scheme appears to induce nearly the rest of the firms to export.

Although it is beneficial for firms to export, this benefit for the Australian economy may be muted if the EMDG scheme induces firms to substitute domestic sales for exports.<sup>18</sup> To measure the extent in which firms as substituting, we look at a measure of export intensity, exports as a share of turnover. The average estimates for all three models in the EMDG Only treatment are positive, but we can see from the 95 per cent confidence

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<sup>17</sup> As a robustness check, we restricted the definition for any firm which had export sales in excess of \$5,000 to be considered an exporter. The results were robust to the definition of exporter.

<sup>18</sup> Following the work of Melitz (2003), there is an extensive literature which evaluates how export activity may have positive impacts arising from resource reallocation in the domestic economy including the benefits from learning in the export market. Therefore, a substitution from domestic sales to export may not be necessarily bad for the domestic economy. A deeper analysis of this issue and the broader effect of export promotion programs such as Austrade's EMDG on the future would be fruitful.

interval that these results are not statistically significant. Similarly, while the average estimates for the EMDG + TS treatment are negative, we again do not see statistically significant results. This suggests that the export sales are true growth for firms and not merely a substitution of their customers.

Employment is also an important policy outcome, so we explored the relationship between the EMDG scheme and the headcount of firms.<sup>19</sup> The average estimated impact of the EMDG scheme on employment ranged between an 8.6 per cent increase for the 1NN model and 11.2 per cent increase for the 5NN model. The 95 per cent confidence intervals ranged between 6.9 and 12.8 per cent. The typical firm in the scheme employed 28.5 people prior to treatment, so it is estimated that the scheme increased employment between 1.9 and 3.6 people per firm. The estimated impact of treatment for the EMDG + TS treatment was higher with the average impact ranging between 16.1 and 20.1 per cent for the 1NN and 5NN models respectively. As the average pre-treatment firm size for the EMDG + TS cohort was 78.4 people, this translates into an additional 12.6 to 15.8 employees per firm after treatment.

Similar to export intensity, we further looked at outcomes of labour and capital productivity to measure how the structure of a firm changed with an EMDG.<sup>20</sup> The estimates for the average impact of EMDG on labour productivity was positive, but not statistically significant at the 95 per cent confidence level for both the EMDG Only and EMDG + TS treatments. This is consistent with the increased employment results, suggesting that the value added in a firm per employee did not increase as a firm increased their staffing levels to handle the increased exports. In contrast, the estimates for capital productivity increased and were statistically significant estimates in the EMDG Only models as well as our preferred 1NN model for the EMDG + TS treatment. This suggests firms which chose to engage in export-related activities had been not fully utilising their capital stock in the domestic and pre-existing export markets.

Survival models are a further method to explore the impact of the EMDG scheme on firm performance. We consider two definitions of survival. The first is whether EMDGs assisted firms' likelihood to continue to actively trade.<sup>21</sup> To estimate this, we use a probit model with the outcome whether the firm was still actively in 2017 with an independent variable defined as whether a firm had received one of the two treatments between 2012-13 and 2016-17. The results suggest that in the 1NN matching, having qualified EMDG expenditures increased the probability that a firm survived by 5.4 percentage points, with the 95 per cent confidence interval ranging from 4.3 to 6.5 percentage points. With 4,686 treated firms, this suggests that around 253 firms continued to trade in 2016-17 that would not have in the absence of the EMDG scheme. The

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<sup>19</sup> Estimates for FTE were similar to the estimated impact on headcount.

<sup>20</sup> Labour productivity is measured as the firm's value added per employee. Capital productivity is measured as the firm's value added per capital asset.

<sup>21</sup> We define actively trading if a firm has non-missing turnover or employment data in BLADE in the current or future fiscal years.



combined EMDG + TS treatment was also found to have a statistically significant impact on the probability of survival. The average estimates for the 1NN model are an increase of 6.7 percentage points with a 95 per cent confidence interval ranging from 3.9 to 9.6 percentage points. With 657 firms in the latter treatment group, this suggests that another 44 firms were still actively trading in 2016-17 that would not have otherwise.

The second set of survival estimates focuses on the survival of firms' exporter status. Conceptually this can be more complicated than firm survival as a firm in either the control or treatment group may be exporters or may enter the export market in any given time period. To control for these issues, we run a parametric survival model using the Weibull distribution as a baseline to predict the relative hazard of exiting the export market. From these estimates, we create an estimate of the impact that EMDGs have on the change in the probability of a firm leaving the export market. Thus our estimates suggest that the EMDG scheme lowers the probability of a firm leaving the export market by 11.6 percentage points in the 1NN model for the EMDG only treatment. The 95 per cent confidence interval for the model ranges from 10.8 to 12.3 percentage points. The estimates for the EMDG + TS are similar with the average impact for the 1NN model being 12.3 percentage points and a 95 per cent confidence interval ranging from 11.0 to 13.5 percentage points. As earlier, this suggests that the EMDG scheme assisted 544 firms receiving EMDGs and another 80 firms receiving both EMDGs plus tailored services to continue to export during the period of study. Given the short period of the study, it would be inappropriate to estimate the length of the period in which we would expect the typical firm to continue to be an exporter.

## **5.2 Results by ANZSIC Sector: Resources, Manufacturing, and Services**

In addition to estimating the overall impact, we have explored the impact of EMDGs vary across three broad economic sectors: Resources, Manufacturing and Services. Organisations in Resources are any firms which has an ANZSIC one-digit classification, "A" or "B", organisations in Manufacturing are any firms with a classification in "C", while Services are any organisation in the remaining ANZSIC divisions. The interpretation of these results in Tables 5.2 through 5.4 are the same contain the same control groups as found in Table 5.1. It should be noted that in the matching models, the matches for the control group are constrained to be within the same broad economic sector as the treatment firm. This varies slightly in the overall model as that restriction does not apply.

The average impact of the results for services appear to underperform relative to manufacturing and resources. Nonetheless, all broad sectors have had positive firm performance due to their participation in the EMDG scheme. It should be noted however that in the case of capital productivity, we found statistically significant effects only within the manufacturing sector. This could be suggestive that while manufacturing firms may have idle capital stock available for exporting, this was not true for resource and service firms.

When comparing the differences between the broad sectors, it is again important to be cautious when comparing the magnitudes between the average impacts of the various outcomes. In cases where the 95 per cent confidence intervals overlap across sectors or across treatments, from a statistical point of view, we cannot reject the hypothesis that the estimated impacts are equal. As also indicated in the tables the missing estimates for the survival probability for Resource firms in the EMDG + TS treatment is due to no failures in the treatment group and is noted by “N/A” in the tables.

**Table 5.2: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in Resources**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
No Matching	<b>196.4*</b>	159.1	233.7	<b>312.7*</b>	240.8	384.6
1NN Matching	<b>201.7*</b>	150.8	252.6	<b>277.0*</b>	152.6	401.4
5NN Matching	<b>195.5*</b>	152.1	238.9	<b>326.9*</b>	226.9	426.9
<b>Export Participation (% Points)</b>						
No Matching	<b>22.2*</b>	14.9	29.4	<b>27.4*</b>	13.9	41.0
1NN Matching	<b>19.9*</b>	11.1	28.7	<b>25.8*</b>	8.5	43.2
5NN Matching	<b>25.3*</b>	16.9	33.7	<b>32.3*</b>	17.0	47.7
<b>Export Intensity (Share Sales)</b>						
No Matching	<b>90.2*</b>	17.1	163.2	10.6	-29.4	50.5
1NN Matching	74.8	-72.7	222.3	<b>18.2*</b>	10.5	25.9
5NN Matching	95.8	-3.4	195.0	<b>15.9*</b>	10.3	21.4
<b>Employment (%)</b>						
No Matching	0.0	-8.0	8.0	13.8	-1.1	28.6
1NN Matching	<b>11.9*</b>	3.2	20.5	6.6	-14.0	27.2
5NN Matching	4.8	-3.1	12.6	12.0	-4.7	28.6
<b>Labour Productivity (%)</b>						
No Matching	-10.5	-25.4	4.5	6.0	-18.3	30.2
1NN Matching	-13.8	-31.8	4.3	12.4	-19.8	44.6
5NN Matching	-9.1	-24.0	5.8	14.1	-10.6	38.8
<b>Capital Productivity (%)</b>						
No Matching	13.7	-16.1	43.5	-43.5	-95.3	8.2
1NN Matching	16.7	-20.7	54.0	-5.2	-77.1	66.6
5NN Matching	18.9	-13.2	51.0	-26.3	-84.1	31.6
<b>Survival Probability (% points)</b>						
No Matching	<b>8.1*</b>	2.5	13.6	N/A		
1NN Matching	<b>6.0*</b>	0.3	11.8	N/A		
5NN Matching	<b>7.2*</b>	1.3	13.2	N/A		
<b>Export Survival (% points)</b>						
No Matching	<b>12.0*</b>	9.6	14.3	<b>12.4*</b>	8.2	16.6
1NN Matching	<b>9.7*</b>	6.1	13.4	6.5	-1.8	14.8
5NN Matching	<b>13.7*</b>	10.9	16.4	<b>9.7*</b>	4.8	14.6

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. "No Matching" uses all firms seeking general services, excluding those also receiving any other Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Firms are classified as resources if they are classified as "A" or "B" in the ANZSIC (2006) classifications. "N/A" indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated.

**Table 5.3: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in**

**Manufacturing**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
No Matching	<b>226.2*</b>	205.6	246.8	<b>258.3*</b>	217.2	299.4
1NN Matching	<b>218.1*</b>	192.3	243.8	<b>276.9*</b>	222.8	330.9
5NN Matching	<b>224.0*</b>	201.0	247.0	<b>276.8*</b>	229.6	324.0
<b>Export Participation (% Points)</b>						
No Matching	<b>30.1*</b>	25.9	34.3	<b>64.7*</b>	49.8	79.5
1NN Matching	<b>29.0*</b>	24.2	33.9	<b>59.7*</b>	43.5	75.9
5NN Matching	<b>30.9*</b>	26.3	35.5	<b>69.6*</b>	54.9	84.3
<b>Export Intensity (Share Sales)</b>						
No Matching	-13.8	-46.9	19.4	11.9	-17.2	41.0
1NN Matching	-18.8	-64.2	26.5	13.9	-6.4	34.2
5NN Matching	-14.9	-53.8	24.0	18.3	-24.2	60.9
<b>Employment (%)</b>						
No Matching	<b>11.7*</b>	8.4	15.0	<b>19.9*</b>	13.5	26.2
1NN Matching	<b>9.6*</b>	5.9	13.2	<b>22.7*</b>	15.0	30.5
5NN Matching	<b>10.6*</b>	7.2	14.0	<b>23.8*</b>	17.3	30.3
<b>Labour Productivity (%)</b>						
No Matching	5.3	-0.1	10.8	2.9	-6.9	12.8
1NN Matching	5.9	-0.2	12.1	-5.6	-18.0	6.8
5NN Matching	<b>6.4*</b>	0.8	12.0	3.0	-7.2	13.2
<b>Capital Productivity (%)</b>						
No Matching	<b>14.7*</b>	0.3	29.0	20.0	-9.7	49.7
1NN Matching	<b>22.9*</b>	6.6	39.1	14.6	-21.2	50.5
5NN Matching	<b>16.9*</b>	1.8	31.9	18.9	-11.9	49.7
<b>Survival Probability (% points)</b>						
No Matching	<b>6.2*</b>	3.9	8.5	<b>13.8*</b>	5.0	22.6
1NN Matching	<b>6.4*</b>	3.7	9.1	4.1	-1.0	9.3
5NN Matching	<b>7.4*</b>	4.7	10.2	<b>11.2*</b>	3.4	19.0
<b>Export Survival (% points)</b>						
No Matching	<b>10.3*</b>	9.2	11.4	<b>25.5*</b>	24.5	26.5
1NN Matching	<b>11.5*</b>	10.2	12.8	<b>29.3*</b>	27.0	31.7
5NN Matching	<b>11.0*</b>	9.9	12.0	<b>24.8*</b>	23.6	26.0

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. "No Matching" uses all firms seeking general services, excluding those also receiving any other Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Firms are classified as manufacturing if they are classified as "C" in the ANZSIC (2006) classifications.

**Table 5.4: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in Services**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
No Matching	<b>146.9*</b>	137.3	156.5	<b>162.0*</b>	141.0	183.0
1NN Matching	<b>132.9*</b>	120.6	145.2	<b>176.5*</b>	145.2	207.9
5NN Matching	<b>136.6*</b>	125.4	147.7	<b>187.0*</b>	161.4	212.6
<b>Export Participation (% Points)</b>						
No Matching	<b>16.0*</b>	14.3	17.7	<b>18.0*</b>	13.7	22.2
1NN Matching	<b>14.7*</b>	12.6	16.7	<b>24.9*</b>	19.8	30.0
5NN Matching	<b>15.1*</b>	13.2	17.1	<b>25.4*</b>	20.9	29.9
<b>Export Intensity (Share Sales)</b>						
No Matching	13.7	-56.4	83.9	-10.7	-223.7	202.2
1NN Matching	10.2	-90.6	111.1	0.6	-3.8	5.0
5NN Matching	15.7	-70.1	101.6	-28.1	-344.8	288.6
<b>Employment (%)</b>						
No Matching	<b>9.9*</b>	8.1	11.8	<b>18.7*</b>	14.9	22.4
1NN Matching	<b>8.8*</b>	6.9	10.8	<b>18.9*</b>	14.3	23.5
5NN Matching	<b>10.4*</b>	8.5	12.2	<b>20.6*</b>	16.7	24.5
<b>Labour Productivity (%)</b>						
No Matching	1.2	-2.7	5.0	3.7	-4.5	11.9
1NN Matching	-0.2	-4.3	4.0	6.2	-3.6	15.9
5NN Matching	0.8	-3.1	4.7	4.6	-3.9	13.1
<b>Capital Productivity (%)</b>						
No Matching	3.5	-3.2	10.1	-4.2	-19.2	10.9
1NN Matching	5.3	-2.3	12.8	6.1	-12.4	24.6
5NN Matching	5.6	-1.5	12.6	3.5	-12.4	19.5
<b>Survival Probability (% points)</b>						
No Matching	<b>8.0*</b>	6.9	9.1	<b>22.8*</b>	16.4	29.2
1NN Matching	<b>5.4*</b>	4.2	6.6	<b>6.0*</b>	2.9	9.1
5NN Matching	<b>5.8*</b>	4.6	7.0	<b>10.1*</b>	6.1	14.2
<b>Export Survival (% points)</b>						
No Matching	<b>9.0*</b>	8.2	9.8	<b>9.0*</b>	7.9	10.1
1NN Matching	<b>10.2*</b>	9.3	11.1	<b>11.0*</b>	9.5	12.6
5NN Matching	<b>10.4*</b>	9.6	11.2	<b>9.1*</b>	8.0	10.3

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. "No Matching" uses all firms seeking general services, excluding those also receiving any other Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Firms are classified as services if they are classified in any sector outside of "A" or "B" or "C" in the ANZSIC (2006) classifications.

### 5.3 Results by Turnover Bands

As a further exploration of the impact of the EMDG scheme, we disaggregated the sample into nine different bands of firms' average pre-treatment turnover. These bands are adjusted using an industry deflator and the bands are in 2002 dollars. These bands were chosen to be comparable to other work done by Austrade. It should be noted that the range of the turnover bands increases due to the smaller number of firms that are contained in each band to ensure that we can accurately estimate the impact of EMDGs within that band. The number of treated firms and mean pre-treatment characteristics can be found in Table 3.2. Similar to Section 5.2, when selecting firms for matching, the pool of control firms were constrained to be within the same pre-treatment turnover band as those in the treatment group. Estimates of the cumulative impacts of EMDG + TS on firm performance by turnover band can be found in Table A3.1. We focus our interpretation to three turnover bands: \$0 - \$250k (low band), \$1m - \$2.5m (middle band), and \$20m - \$50m (high band).

In the low band, we see that, on average, qualifying EMDG expenditures are associated with a cumulative impact of 227 to 239 per cent increase in export sales. The 95 per cent confidence interval ranges from a low of 204 per cent to a high of 259 per cent, depending on whether we match on one or five nearest neighbours. Regardless, the estimates do not vary substantially depending on the specification. With average exports of \$22,303, this translates into an additional \$50,000 to \$53,000 in export sales as a result of the expenditures used as part of the successful EMDG grant application. We further see a large increase in export participation, leading to an average increase of 19.7 to 22.3 percentage point increase in the probability that a firm is exporting. The effect on employment is also statistically significant. The results suggest that these small firms increase their employment on average between 15.2 and 15.4 per cent with the 95 per cent confidence intervals ranging between 11.6 and 19.2 per cent. We further see a statistically significant increase in the probability that firms receiving an EMDG are still trading in 2017 when compared to non-treated firms. On average, an EMDG is associated with a 9.5 to 12.9 percentage point increase in the likelihood of survival.

For firms in the middle band, we see that the average impact of an EMDG on export sales averages between 159 and 161 per cent with a 95 per cent confidence interval ranging between 135 and 183 per cent. The difference in the confidence intervals for the medium band compared to the low band suggests that firms with larger pre-treatment sales see the intensive margins of exports increase less relative to smaller firms. This is consistent with our expectations that larger firms are not able to continue the growth trajectory of smaller firms. For firms in this band, we estimate that qualifying EMDG expenditures is associated with an average increase of \$420,000 in exports. The average impact for export participation is estimated between 17.8 and 18.8 percentage points with the 95 per cent confidence interval ranging between 13.8 and 22.7 percentage points. As the confidence interval between the two bands overlap, we cannot reject the hypothesis that the increase in export participation is different between the two bands. Furthermore, we have estimated that the

average impact on employment ranges between 11.9 and 14.6 per cent with a 95 per cent confidence interval ranging between 8.2 and 18.0 per cent. Lastly, we found firm survival in the band to be positive and statistically significant. On average, firms in this band were 4.3 to 4.7 percentage points more likely to be actively trading as a result of the EMDG scheme, with the 95 per cent confidence interval ranging between 2.0 and 2.5 percentage points on the lower band and 6.5 and 6.8 percentage point on the upper band.

In the high band, we find results that diverge from the lower bands. In regards to export sales, we see that the average impact ranges between 65 and 138 per cent. However, the estimate is statistically significant in the 1NN model as the 95 per cent confidence interval ranges less than zero in the 5NN band. While the 1NN is our preferred model, both the 1NN and 5NN model is not statistically significant in the \$10 million to \$20 million band, thus we believe there is limited statistical evidence that these results are statistically different than zero. The evidence for a positive relationship between export participation and the EMDG in the largest band is also mixed. While the average estimate ranges between 13.2 and 26.1 percentage points, the results are only statistically significant for the 1NN model. These results however may in part be driven by the higher pre-treatment export participation for larger firms. On average, employment is estimated to fall in the largest band, but as the confidence interval includes zero, the results are not statistically significant. Lastly, we were not able to find statistically significant impacts on firm survival. However, similar to export participation, the baseline survival for large firms was high enough, that it would be unlikely that EMDG could have a large economic impact.

**Table 5.5: Estimated cumulative impact of EMDG Only on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
\$0 - \$250k	<b>226.7*</b>	204.1	249.4	<b>238.8*</b>	219.0	258.7
\$250k - \$500k	<b>175.6*</b>	144.4	206.7	<b>183.9*</b>	156.3	211.5
\$500k - \$750k	<b>197.7*</b>	159.7	235.7	<b>192.1*</b>	158.1	226.0
\$750k - \$1m	<b>180.1*</b>	137.1	223.0	<b>177.9*</b>	138.9	216.9
\$1m - \$2.5m	<b>159.3*</b>	135.4	183.3	<b>160.5*</b>	138.8	182.1
\$2.5m - \$5m	<b>90.4*</b>	58.7	122.0	<b>103.2*</b>	74.8	131.7
\$5m - \$10m	<b>113.4*</b>	73.7	153.1	<b>128.3*</b>	92.9	163.7
\$10m - \$20m	31.2	-14.4	76.9	28.2	-14.0	70.3
\$20m - \$50m	<b>138.1*</b>	61.7	214.6	65.1	-3.5	133.7
<b>Export Participation (% Points)</b>						
\$0 - \$250k	<b>19.7*</b>	14.5	25.0	<b>22.3*</b>	17.3	27.4
\$250k - \$500k	<b>14.8*</b>	10.1	19.5	<b>14.1*</b>	9.8	18.5
\$500k - \$750k	<b>22.0*</b>	15.1	29.0	<b>20.5*</b>	14.2	26.8
\$750k - \$1m	<b>13.3*</b>	7.2	19.5	<b>12.0*</b>	6.5	17.4
\$1m - \$2.5m	<b>17.8*</b>	13.8	21.9	<b>18.8*</b>	14.9	22.7
\$2.5m - \$5m	<b>10.5*</b>	5.3	15.7	<b>12.6*</b>	7.5	17.6
\$5m - \$10m	<b>16.6*</b>	10.0	23.3	<b>19.0*</b>	12.7	25.3
\$10m - \$20m	3.4	-5.6	12.4	3.0	-5.8	11.7
\$20m - \$50m	<b>26.1*</b>	7.6	44.6	13.2	-2.3	28.7
<b>Export Intensity (Share Sales)</b>						
\$0 - \$250k	1.9	-60.2	64.0	-132.9	-298.4	32.7
\$250k - \$500k	28.2	-26.1	82.5	27.6	-18.6	73.8
\$500k - \$750k	308.2	-487.7	1104.0	226.0	-447.2	899.3
\$750k - \$1m	203.3	-127.8	534.4	222.9	-67.5	513.3
\$1m - \$2.5m	<b>3.0*</b>	0.1	5.8	<b>3.3*</b>	0.7	5.8
\$2.5m - \$5m	<b>2.6*</b>	0.3	4.9	<b>2.6*</b>	0.7	4.5
\$5m - \$10m	-3.5	-16.6	9.6	-3.5	-14.3	7.4
\$10m - \$20m	<b>1.6*</b>	0.2	3.1	<b>1.4*</b>	0.2	2.7
\$20m - \$50m	<b>6.0*</b>	3.8	8.3	<b>3.6*</b>	1.6	5.5



**Table 5.5 (Continued): Estimated cumulative impact of EMDG Only on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Employment (%)</b>						
\$0 - \$250k	<b>15.4*</b>	11.6	19.2	<b>15.2*</b>	11.7	18.8
\$250k - \$500k	<b>8.1*</b>	3.2	12.9	<b>11.5*</b>	7.1	16.0
\$500k - \$750k	<b>10.6*</b>	4.8	16.5	<b>14.8*</b>	9.2	20.3
\$750k - \$1m	<b>16.0*</b>	9.9	22.1	<b>15.5*</b>	9.6	21.4
\$1m - \$2.5m	<b>11.9*</b>	8.2	15.6	<b>14.6*</b>	11.2	18.0
\$2.5m - \$5m	<b>9.0*</b>	4.2	13.9	<b>13.1*</b>	8.6	17.6
\$5m - \$10m	<b>9.2*</b>	3.6	14.7	<b>11.3*</b>	6.2	16.4
\$10m - \$20m	2.9	-4.0	9.8	2.3	-4.2	8.7
\$20m - \$50m	-12.5	-24.0	-1.1	-8.6	-19.4	2.1
<b>Labour Productivity (%)</b>						
\$0 - \$250k	-1.4	-15.6	12.7	3.3	-9.4	16.0
\$250k - \$500k	-5.0	-17.4	7.4	2.7	-8.7	14.1
\$500k - \$750k	2.9	-9.0	14.8	2.9	-8.1	13.8
\$750k - \$1m	0.6	-13.3	14.5	2.8	-10.2	15.9
\$1m - \$2.5m	3.7	-3.1	10.5	3.1	-3.1	9.3
\$2.5m - \$5m	2.1	-6.1	10.3	3.4	-4.2	10.9
\$5m - \$10m	3.9	-5.5	13.2	3.6	-5.1	12.2
\$10m - \$20m	-8.0	-20.1	4.2	-2.7	-14.4	9.1
\$20m - \$50m	-13.7	-32.5	5.1	-13.0	-29.9	4.0
<b>Capital Productivity (%)</b>						
\$0 - \$250k	-10.8	-33.3	11.8	-12.1	-32.8	8.5
\$250k - \$500k	18.7	-2.3	39.7	<b>24.9*</b>	4.9	45.0
\$500k - \$750k	-12.6	-37.3	12.2	-3.9	-26.6	18.8
\$750k - \$1m	21.8	-3.2	46.8	<b>25.4*</b>	1.7	49.1
\$1m - \$2.5m	-0.5	-14.5	13.4	3.5	-9.5	16.6
\$2.5m - \$5m	7.7	-10.2	25.6	9.0	-7.7	25.6
\$5m - \$10m	3.6	-17.9	25.2	4.7	-15.0	24.3
\$10m - \$20m	27.0	-2.9	56.8	<b>27.6*</b>	0.2	54.9
\$20m - \$50m	-17.4	-65.6	30.7	9.5	-32.3	51.3

**Table 5.5 (Continued): Estimated cumulative impact of EMDG Only on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Survival Probability (% points)</b>						
\$0 - \$250k	<b>9.5*</b>	6.8	12.1	<b>12.9*</b>	10.1	15.7
\$250k - \$500k	<b>5.3*</b>	2.0	8.5	<b>6.1*</b>	2.9	9.2
\$500k - \$750k	<b>5.0*</b>	1.4	8.5	<b>5.9*</b>	2.3	9.4
\$750k - \$1m	0.2	-2.6	3.0	3.0	-0.2	6.2
\$1m - \$2.5m	<b>4.3*</b>	2.0	6.5	<b>4.7*</b>	2.5	6.8
\$2.5m - \$5m	<b>4.4*</b>	1.6	7.2	<b>4.9*</b>	2.1	7.7
\$5m - \$10m	<b>5.2*</b>	1.5	9.0	<b>3.9*</b>	0.6	7.3
\$10m - \$20m	1.8	-1.9	5.5	2.3	-1.3	5.9
\$20m - \$50m	0.0	-9.5	9.5	-1.8	-8.8	5.2
<b>Export Survival Hazard (% points)</b>						
\$0 - \$250k	<b>14.0*</b>	11.5	16.5	<b>13.2*</b>	11.1	15.3
\$250k - \$500k	<b>10.3*</b>	7.9	12.6	<b>11.9*</b>	9.9	14.0
\$500k - \$750k	<b>18.7*</b>	14.4	23.0	<b>15.8*</b>	12.8	18.8
\$750k - \$1m	<b>9.1*</b>	6.5	11.7	<b>10.2*</b>	7.8	12.6
\$1m - \$2.5m	<b>17.1*</b>	15.4	18.9	<b>15.5*</b>	14.0	17.0
\$2.5m - \$5m	<b>4.9*</b>	3.2	6.7	<b>8.7*</b>	7.2	10.3
\$5m - \$10m	<b>15.2*</b>	13.2	17.2	<b>15.0*</b>	13.5	16.5
\$10m - \$20m	<b>10.1*</b>	8.8	11.4	<b>14.1*</b>	12.8	15.5
\$20m - \$50m	-10.4	-12.1	-8.7	-3.1	-4.6	-1.5

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. "No Matching" uses all firms seeking general services, excluding those also receiving any other Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Bands are based on average pre-treatment real turnover in 2002 dollars.

## **Acknowledgement**

Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of Austrade or the ABS. All results have been reviewed to ensure that no confidential information is disclosed. We wish to thank Geoffrey Bailey, Heather Cotching, David Hazlehurst, Sherry Li, Matthew Murphy, Puneet Rikhi, and Joshua Saunders from Austrade for substantial comments and suggestions and the use of program participants database; Barry Tynan, John Jones, Stephanie Koo, Kim McCosker, and Talei Parker from the ABS for making the analysis of BLADE data possible.

## Appendix 1 Method

### A1.1 Difference-in-differences (DID) analysis

We derived average treatment effects on the treated as our estimate of the impact of the EMDGs on participants' export performance using a quasi-experimental method known as difference-in-differences (DID). To implement the method, we required observable data on the export performance of participating and non-participating firms before and after receiving tailored services. In the stylised diagram in Figure A.2 below, the observed data are labelled with "green" coloured labels T0 and C0 (corresponding to the average performance of participants and non-participants before receiving tailored services, respectively) and T1 and C1 (corresponding to the average performance of participants and non-participants after receiving tailored services, respectively).

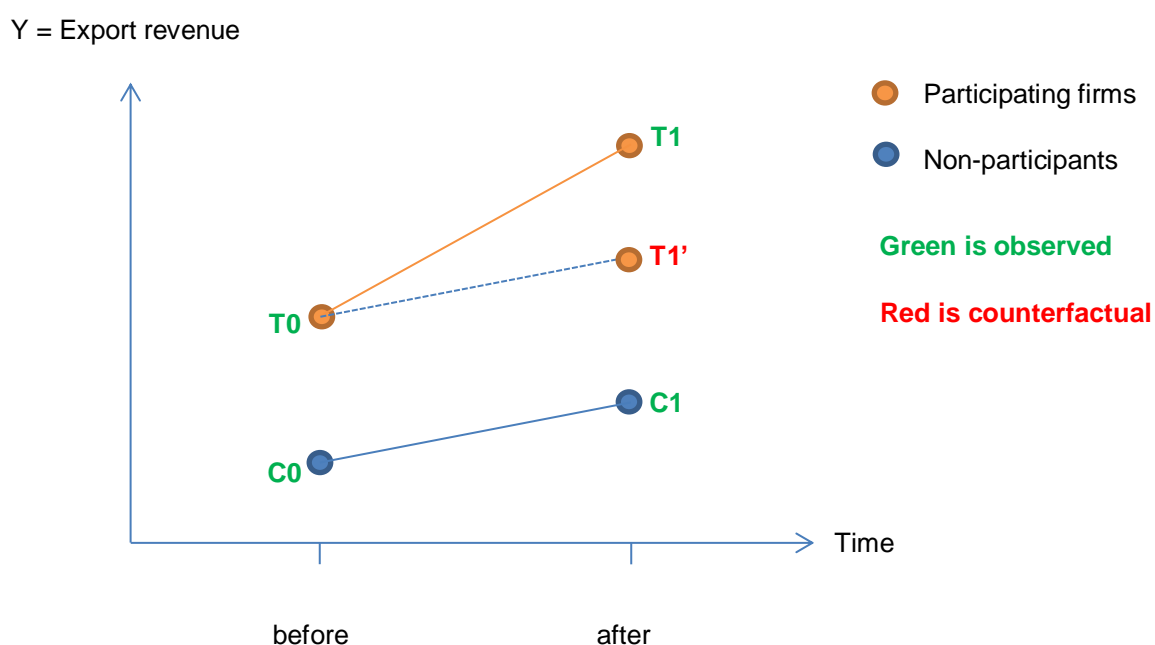


Figure A.2: Impact evaluation with before and after data

#### Naïve impact estimates

Given the observed data as defined above, one naïve estimate of the impact is to compare the difference in average export performance (Y) at points T1 and C1 (that is,  $Impact_{Naive1} = Y_{T1} - Y_{C1}$ ). This naïve estimate is usually produced when we do not observe before and after data. The problem with this naïve estimate is we do not know whether participating firms are always superior to non-participating firms. Note that Figure A.1 is drawn such that  $Y_{T0} > Y_{C0}$  to illustrate the possibility that participating firms may in fact have better export performance even before the program.

Another slightly less naïve estimation method that people can use when before and after data are available is to measure impact as:  $Impact_{Naive2} = Y_{T1} - Y_{T0}$ . This estimate is an improvement over the previous one

since it does not suffer from the “upward bias” from any pre-existing superior performance of the participating firms. That problem is avoided by making a comparison based only on the performance of the participating firms. However, there is still another problem in terms of completely attributing the change in the performance of participants ( $Y_{T1} - Y_{T0}$ ) to the tailored services. It is plausible that some of the measured improvement in participating firms’ performance comes from other unobserved reasons unrelated to tailored service participation. In Figure A.1, this possibility is illustrated by the counterfactual point T1’ to denote the average export performance ( $Y_{T1’}$ ) had there be no tailored services provided by Austrade. The closer T1’ is to T1, that is as  $Y_{T1’}$  closer to  $Y_{T1}$ , then the more severe the misattribution problem from using  $Impact_{Naive2}$  measure.

### DID impact estimate

To address the attribution bias problem of  $Impact_{Naive2}$ , we can redefine the impact measure as:

$$Impact = Y_{T1} - Y_{T1’} \quad (A1.1)$$

The problem with implementing the measure  $Impact$  in (A1.1) is that it involves  $Y_{T1’}$  which is an unobserved counterfactual. The difference-in-differences approach solves this problem by making a reasonable assumption that whatever unobserved factors there are which are unrelated to tailored service participation, they affect performance before and after the program for both participants and non-participants in a similar way. This assumption is also known as the common trend assumption as shown in Figure A.1 above by the common slopes of the lines C0-C1 and T0-T1’.

Under the common trend assumption, we can estimate  $Y_{T1’} - Y_{C1}$  as  $Y_{T0} - Y_{C0}$  such that the impact of tailored services can be measured as:

$$\begin{aligned} Impact_{DID} &= Y_{T1} - Y_{T1’} \\ &= (Y_{T1} - Y_{C1}) - (Y_{T1’} - Y_{C1}) \\ &= (Y_{T1} - Y_{C1}) - (Y_{T0} - Y_{C0}) \\ &= (Y_{T1} - Y_{T0}) - (Y_{C1} - Y_{C0}) \end{aligned} \quad (A1.2)$$

where in the third line we substitute  $Y_{T0} - Y_{C0}$ , which is observable, for  $Y_{T1’} - Y_{C1}$  which is unobserved. Thus,  $Impact_{DID}$  is essentially computed based on the difference of two observed differences and hence where the difference-in-differences term comes from.

## A1.2. Basic DID

This and subsequent sections and Appendix 3 provide a more technical discussion of the implementation of the DID method in this report. Denote program participation status as  $D_{it}$  where  $D_{it} = 1$  if firm  $i$  receives tailored services in financial year  $t$  and  $D_{it} = 0$  otherwise. Denote  $X_{it}$  as the corresponding vector of observed covariates of firm and program characteristics. Denote  $Y_{it}^1$  as the observed outcome (say, export revenues) and  $Y_{it}^0$  as the unobserved (counterfactual) outcome.

Hence,  $E[Y_{it}^1|X_{it}, D_{it} = 1]$  is the observed average outcome of participating firms conditional on  $X_{it}$  and  $E(Y_{it}^0|X_{it}, D_{it} = 1)$  is the counterfactual average outcome of participating firms had they not participated. The impact of trade promotion program is measured by the average treatment effect on the treated (ATT) denoted by  $\tau$ :

$$\tau = E(Y_{it}^1|X_{it}, D_{it} = 1) - E(Y_{it}^0|X_{it}, D_{it} = 1) \quad (\text{A1.3})$$

In equation (A1.3),  $\tau$  measures the average change in the outcomes of participating firms as the difference between observed average outcomes after treatment and counterfactual average outcomes had the firms not received the treatments. It is clear that to obtain an unbiased estimate of  $\tau$  we need an unbiased estimate of  $E(Y_{it}^0|X_{it}, D_{it} = 1)$ , the counterfactual average outcome. An obvious candidate is to use the average outcome of a selected group of non-participants, which we call the control group. This control group would need to be identified by taking into account any potential non-randomness or endogenous selection in program participation.

In other words, we need to select the control group such that relevant firm characteristics are comparable in both groups. We look at two different potential pools for control groups. The first is the pool of all economically active firms in the ABS BLADE database. The second is the pool of organisations that have accessed general services from Austrade, but have not subsequently received tailored services. The latter allows us to select on otherwise unobserved characteristics such as the signal to expand an export market which is not captured in the BLADE Database.

For both control groups, we further controlled for the characteristics in two ways. First, we implemented the basic difference-in-differences method. The main idea was to use the longitudinal nature of our linked Austrade administrative data and the ABS BAS databases. Specifically, we used the repeated observations of the same firms across the years in order to control for time invariant and unobserved characteristics that lead to systematic selection to exporting and to the Austrade tailored services. Using difference-in-differences, we estimated  $\tau$  by comparing the change in the export outcomes of participants before and after the treatment

to the change in the export outcomes of non-participant before and after the treatment. This is shown in equation (A1.4) below:

$$Y_{it} = X_{it}\beta + \tau D_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (\text{A1.4})$$

Note that in specifying equation (A2.4), we assume the conditional expectation function  $E(Y|X, D)$  is linear and any unobserved firm characteristics is decomposable into a time-invariant firm specific fixed effects ( $\mu_i$ ), common across firms year effect ( $\lambda_t$ ) and a random component ( $\varepsilon_{it}$ ). The introduction of the covariates ( $X$ ) linearly may lead to inconsistent estimate of  $\tau$  due to potential misspecification (Meyer, 1995; Abadie, 2005). In order to avoid this problem, we followed Volpe Martincus, and Carballo (2008) and augment the difference-in-differences analysis with a matching analysis as described below.

### **A1.3 Matched DID**

As discussed above, a key identification assumption of the DID method is the common trend assumption. To minimize the possibility that this assumption is violated, we needed to make sure that the control group, that is the set of non-participants, are as “similar” as possible to the participants. This is particularly important when we know that program participation is not random, that is when there is any systematic selection bias into receiving tailored services. The matched-DID impact measure aims to address the problem by making a slightly weaker assumption that there is a common trend once participants and non-participants are matched on observable characteristics.

The matched difference-in-differences method can estimate treatment effects without imposing the linear functional form restriction in the conditional expectation of the outcome variable is (Arnold and Javorcik, 2005; Gorg et al., 2008). The matching method part controls for any endogenous selection into programs based on observables (Heckman and Robb, 1985; Heckman et al., 1998). The difference-in-differences part of the method controls for endogenous selection into programs based on time invariant unobservables. Therefore, the matched difference-in-differences estimate of the treatment effects ( $\tau$ ) is the difference between the change in the outcomes before and after program participation of treated firms and that of matched non-participating firms. Any imbalance between the treated and control groups in the distribution of covariates and time-invariant effects is controlled for. Note however that we still need to assume that there are no time-varying unobserved effects influencing selection into treatment and treatment outcomes (see Heckman et al., 1997; Blundell and Costa Dias, 2002).

In practice, the estimation of  $\tau$  (treatment effects) was conducted in two stages. First, control group members were identified using a matching method such as the propensity score matching (explained below). Second,

equation (A2.4), without the X covariates, was estimated using the treated group and matched control group as the sample.

### **Propensity score matching**

The basic idea is to pair participating firms to the most similar non-participating firms using propensity score. The propensity score was estimated as the predicted probability of a firm to participate in the program based on observed covariates,  $P(X)$ , which do not include the outcome measures. By doing this, we control for observable sources of bias in the estimation of the treatment effect (selection on observables bias). In order to estimate,  $P(X)$ , we controlled for observed factors that determine firms selection into the programmes and export performance, so that programme participation and programme outcomes are independent. The similarity of two given firms was then assessed by how close their propensity scores are.

In this report, we use the following similarity criteria to select the participants and non-participants in computing the  $Impact_{DID}$ :

1. The nearest neighbour (NN1): For each participant, select one non-participant with the most similar propensity score.
2. The five nearest neighbours (NN5): For each participant, select five non-participants with the most similar propensity scores.

To produce relatively reliable estimates of the propensity scores, Volpe Martincus and Carballo (2008) and the literature they cite<sup>22</sup> suggest that we take into account factors that are correlated with different stage internationalisation. Firms at different level of internationalisation appear to have different level of awareness of available promotion programs. In addition, their needs and obstacles also vary by their degree of internationalisation, implying different requirements and expectations from export promotion participation.

In practice, our choice of matching variables was limited by how rich the database we worked with. For this report, we estimated the propensity score as the predicted probability of engaging with Austrade's tailored service program conditional on:

- Total sales revenue
- Exporter Status
- State of Headquarters
- Estimated Age since ABN Registration

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<sup>22</sup> See, as cited in Volpe Martincus and Carballo 2008, Kedia and Chhokar 1986; Naidu and Rao 1993; Diamantopoulos et al. 1993; Naidu and Rao 1993; Czinkota 1996; Moini 1998; Ogram 1982; Seringhaus 1986; Cavusgil 1990; Kotabe and Czinkota 1992; Francis and Collins-Dodd 2004.



- Imports
- Industry

where we used past values (pre-2012-13 financial year) in order to avoid problems with endogeneity in the matching process.

The propensity matching approach was implemented using the *psmatch2* command in Stata software based on the following constructed variables:

1. Identify treated and non-treated firms.  $D_i = 1$  if  $D_{it} = 1$  at any year  $t$ . Otherwise,  $D_i = 0$ . The variable  $D_i$  is the dependent variable for *psmatch2*.
2. For each year, the covariates vector  $X_{it}$  consists of total sales revenues, whether or not an exporter (if the outcome being considered is export sales revenue), import values, state of headquarters, age since ABN or ASIC registration, and one-digit industry code. Thus,  $X_{it}$  measure size and the extent of international engagement of the firms within each broad industry.<sup>23</sup>
3. Using only the years before Austrade's EMDGs program begun (that is, data from 2011-12 or earlier), compute the pre-2012-13 average values of each components in  $X_{it}$  across the years for each firm. Denote this average values as  $X_{ipre}$ ; this covariate vectors is the independent variables for *psmatch2*.
4. The control group is defined as the nearest neighbour matched by *psmatch2* using the variables in steps 1 and 3.

### Survival Analysis

The modern approach to survival analysis discussed in Cleves, Gould and Marchenko (2016) allows researchers to explore the time to observe an event or occurrence. Research in the area allows for data to be right-censored, which indicates that the survival of the units may persist past the date of the study. However, while BLADE data is available from the 2001-02 fiscal years, the period of the programs began only in 2012-13, leaving only a short period to estimate the distribution of survival properly in years. We therefore took a more conservative approach.

To estimate the survival of a firm, we identified if units were still actively trading in the 2016-17 financial year for both the matched treated and control groups. We then estimated the average marginal effect of the treatment (EMDG expenditure or EMDG Expenditure + TS) on the probability of survival using probit analysis.

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<sup>23</sup> Robustness checks were used to look at the stability of estimates across different specifications. Results from the difference-in-differences were stable when including foreign shareholding for the subset of firms with information as well as more refined definitions of industry.

This is possible as all firms in both the control and treatment group were actively trading in the beginning of the study period. If a longer period allowed to conduct the study, we would restrict this analysis to units entering in the treatment group at the beginning of the period and their matched controls to allow for a consistent amount of time to pass to look at their estimated survival.

Export survival is a more complicated process as the control group is not guaranteed to ever be considered “at risk” of leaving the export market as they may not have ultimately entered the market during the period of study, if ever (known as left-truncation). Therefore, we run a parametric survival model assuming the common Weibull distribution which can be adjusted to accommodate the observed truncated and censored data. This leaves us with the relative hazard ratio for firms receiving an EMDG Only (or EMDG + TS) relative to the control group. To ease the interpretation, we then predict the estimated probability of failure for each firm in treated and control groups. The estimated mean and standard deviations are then used to construct the estimated change in the probability of failure in the export market.

## Appendix 2 Matching analysis results

As discussed in Appendix 1, to account for possible systematic selection into participation in EMDG scheme or tailored services, we implemented propensity score matching that is subsequently used to produce difference-in-differences (DID) estimates of the program impacts on both the general and then economically active matched control groups. For the matching variables we included the averages of pre-2012-13 (that is pre-Austrade tailored services) of turnover, export participation, imports, employment and age. We also matched on their industry and state of headquarters. Table A2.1 summarises the coefficient estimates of the propensity equations. Tables A2.2 summarises the matching results for general services.

**Table A2.1: Propensity score matching coefficient estimates with general service control group**

Dependent variable  $D_i$ : Program participation status over 2012-13 to 2016-17

( $D_i = 1$  if business  $i$  participated in any year in the period)

Independent variable	EMDG Only	EMDG + TS
	PSM	PSM
Mean pre-2013 turnover	-8.85e-09*** (2.06e-09)	-1.38e-10 (2.75e-10)
Mean pre-2013 export participation	0.8546*** (0.05556)	1.6728*** (0.1254)
Mean pre-2013 imports	4.42e-08 (6.15e-08)	-8.31e-07*** (3.10e-07)
Mean pre-2013 employment	-0.0000481 (0.0002484)	0.0002973* (0.0001685)
Mean pre-2013 age	-0.06688*** (0.004004)	-0.01937*** (0.00678)
Constant	-0.5075*** (0.2356)	-3.0252*** (0.4371)
Industry fixed effects	Yes	Yes
State fixed effects	Yes	Yes
Sample size	8,032	3,994
Pseudo-R2	0.1290	0.1243

Notes: Estimated using matched Austrade Administrative Data and ABS BAS-BIT databases. The notations \*, \*\*, \*\*\* denote statistically significant estimate at 10, 5, and 1% level. Standard errors are in parentheses. Estimates are the same for both 1 and 5 neighbours.

**Table A2.2: Difference in pre-program participation averages with general service control group**

	Observations		Export Sales					Export Participation					Headcount				
	EMDG Only		Control		Treatment			Control		Treatment			Control		Treatment		
	Control	Treatment	Mean	SE	Mean	SE	P-Value	Mean	SE	Mean	SE	P-Value	Mean	SE	Mean	SE	P-Value
<b>All Firms</b>																	
No Matching	3336	4696															
1NN Matching	1774	4686	631809	123823	456259	28950	0.0500	0.6268	0.0115	0.6793	0.0068	<b>0.0001</b>	35.5	2.3	28.5	1.6	<b>0.0171</b>
5NN Matching	3076	4686	1503615	393524	456259	28950	<b>0.0011</b>	0.5712	0.0089	0.6793	0.0068	<b>0.0000</b>	52.1	4.6	28.5	1.6	<b>0.0000</b>
<b>Manufacturing</b>																	
No Matching	698	781															
1NN Matching	358	781	861355	263029	659258	84068	0.3520	0.7681	0.0223	0.8156	0.0138	0.0627	36.3	3.3	27.0	2.2	<b>0.0184</b>
5NN Matching	634	781	996195	203625	659258	84068	0.1018	0.7019	0.0182	0.8156	0.0138	<b>0.0000</b>	40.6	3.0	27.0	2.2	<b>0.0002</b>
<b>Resources</b>																	
No Matching	460	157															
1NN Matching	114	154	481758	196725	570079	149653	0.7162	0.5877	0.0463	0.6558	0.0384	0.2559	28.1	5.4	25.0	3.1	0.5888
5NN Matching	314	154	750462	353331	570079	149653	0.7266	0.5541	0.0281	0.6558	0.0384	<b>0.0358</b>	28.9	3.7	25.0	3.1	0.4933
<b>Services</b>																	
No Matching	2174	3752															
1NN Matching	1299	3731	1017408	368517	410120	31163	<b>0.0067</b>	0.5889	0.0137	0.6510	0.0078	<b>0.0001</b>	38.4	4.1	29.0	1.9	<b>0.0200</b>
5NN Matching	2083	3731	1830214	602826	410120	31163	<b>0.0017</b>	0.5401	0.0109	0.6510	0.0078	<b>0.0000</b>	61.9	6.9	29.0	1.9	<b>0.0000</b>

**Table A2.3: Difference in pre-program participation averages with general service control group**

	Observations		Export Sales				P-Value	Export Participation					Headcount					
	EMDG Only		Control		Treatment			Control		Treatment			Control		Treatment			P-Value
	Control	Treatment	Mean	SE	Mean	SE		Mean	SE	Mean	SE	P-Value	Mean	SE	Mean	SE		
<b>Turnover: \$0 - \$250k</b>																		
1NN Matching	386	1035	14655	1950	22303	1532	<b>0.0060</b>	0.4534	0.0254	0.4783	0.0155	0.4034	3.9	0.4	4.0	0.2	0.8071	
5NN Matching	693	1035	10290	1194	22303	1532	<b>0.0000</b>	0.3737	0.0184	0.4783	0.0155	<b>0.0000</b>	4.0	0.3	4.0	0.2	0.9450	
<b>Turnover: \$250k - \$500k</b>																		
1NN Matching	216	621	41099	6358	66749	4578	<b>0.0030</b>	0.5602	0.0339	0.6538	0.0191	<b>0.0141</b>	5.8	0.4	6.0	0.3	0.7119	
5NN Matching	359	621	33616	4677	66749	4578	<b>0.0000</b>	0.4930	0.0264	0.6538	0.0191	<b>0.0000</b>	6.1	0.4	6.0	0.3	0.8577	
<b>Turnover: \$500k - \$750k</b>																		
1NN Matching	126	409	68564	15410	113213	9743	<b>0.0226</b>	0.5635	0.0444	0.6968	0.0228	<b>0.0055</b>	8.0	0.6	8.9	0.5	0.4070	
5NN Matching	210	409	66014	11648	113213	9743	<b>0.0032</b>	0.5143	0.0346	0.6968	0.0228	<b>0.0000</b>	8.9	0.5	8.9	0.5	0.9953	
<b>Turnover: \$750k - \$1m</b>																		
1NN Matching	107	300	75869	20711	157079	15030	<b>0.0040</b>	0.7196	0.0436	0.7200	0.0260	0.9941	10.1	0.8	10.8	1.2	0.7348	
5NN Matching	162	300	66435	15166	157079	15030	<b>0.0001</b>	0.6358	0.0379	0.7200	0.0260	0.0620	12.0	1.4	10.8	1.2	0.5463	
<b>Turnover: \$1m - \$2.5m</b>																		
1NN Matching	343	931	121911	17205	260502	14850	<b>0.0000</b>	0.6472	0.0258	0.7186	0.0147	<b>0.0137</b>	17.9	1.1	17.2	0.8	0.6355	
5NN Matching	548	931	97816	12129	260502	14850	<b>0.0000</b>	0.5931	0.0210	0.7186	0.0147	<b>0.0000</b>	18.7	0.9	17.2	0.8	0.2359	
<b>Turnover: \$2.5m - \$5m</b>																		
1NN Matching	209	536	263721	46294	568217	44280	<b>0.0001</b>	0.7560	0.0298	0.7612	0.0184	0.8813	30.8	2.1	31.2	1.4	0.8723	
5NN Matching	342	536	282143	52430	568217	44280	<b>0.0000</b>	0.6959	0.0249	0.7612	0.0184	<b>0.0324</b>	30.7	1.5	31.2	1.4	0.7890	
<b>Turnover: \$5m - \$10m</b>																		
1NN Matching	160	370	689527	132756	1051278	98578	<b>0.0375</b>	0.8000	0.0317	0.8405	0.0191	0.2567	47.9	4.1	49.7	3.1	0.7512	
5NN Matching	266	370	1051278	98578	1051278	98578	<b>0.0047</b>	0.7519	0.0265	0.8405	0.0191	<b>0.0055</b>	55.3	4.0	49.7	3.1	0.2666	
<b>Turnover: \$10m - \$20m</b>																		
1NN Matching	103	207	1645474	385485	2403932	298309	0.1325	0.8058	0.0392	0.8357	0.0258	0.5145	86.6	8.6	88.0	7.4	0.9051	
5NN Matching	164	207	1319793	277324	2403932	298309	0.0096	0.7317	0.0347	0.8357	0.0258	<b>0.0145</b>	99.9	8.4	88.0	7.4	0.2937	
<b>Turnover: \$20m - \$50m</b>																		
1NN Matching	44	73	5179690	1377214	4072961	855303	0.4722	0.8864	0.0484	0.8493	0.0422	0.5760	118.9	17.3	136.3	15.3	0.4665	
5NN Matching	100	73	4108676	864083	4072961	855303	0.9772	0.8000	0.0402	0.8493	0.0422	0.4065	140.1	19.4	136.3	15.3	0.8852	

## Appendix 3 Additional Results

### A3.1 Additional Results for General Services Control Group

**Table A3.1: Estimated cumulative impact of EMDG + TS on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
\$0 - \$250k	78.4	-2.8	159.6	<b>116.1*</b>	50.2	182.0
\$250k - \$500k	<b>333.0*</b>	224.8	441.3	<b>347.0*</b>	265.3	428.8
\$500k - \$750k	<b>345.3*</b>	243.8	446.8	<b>395.0*</b>	305.8	484.2
\$750k - \$1m	<b>369.1*</b>	258.7	479.5	<b>348.1*</b>	262.0	434.3
\$1m - \$2.5m	<b>205.7*</b>	145.9	265.5	<b>217.1*</b>	167.3	267.0
\$2.5m - \$5m	<b>226.4*</b>	158.9	293.9	<b>251.4*</b>	195.8	307.0
\$5m - \$10m	<b>136.2*</b>	70.1	202.2	<b>201.8*</b>	143.7	259.9
\$10m - \$20m	-0.7	-90.1	88.7	-19.6	-99.9	60.7
\$20m - \$50m	84.6	-25.3	194.4	<b>98.0*</b>	0.7	195.2
<b>Export Participation (% Points)</b>						
\$0 - \$250k	5.2	-4.1	14.4	<b>21.1*</b>	7.4	34.8
\$250k - \$500k	<b>40.2*</b>	21.3	59.1	<b>46.9*</b>	31.4	62.4
\$500k - \$750k	<b>30.6*</b>	13.1	48.1	<b>39.1*</b>	23.5	54.7
\$750k - \$1m	<b>37.2*</b>	11.3	63.2	<b>37.5*</b>	14.6	60.5
\$1m - \$2.5m	<b>21.9*</b>	12.7	31.1	<b>30.4*</b>	21.6	39.3
\$2.5m - \$5m	<b>27.0*</b>	15.9	38.1	<b>34.5*</b>	24.4	44.6
\$5m - \$10m	<b>22.0*</b>	9.9	34.1	<b>31.1*</b>	19.7	42.5
\$10m - \$20m	-9.9	-30.0	10.1	-11.6	-30.3	7.1
\$20m - \$50m	8.2	-11.2	27.6	11.9	-10.3	34.0
<b>Export Intensity (Share Sales)</b>						
\$0 - \$250k	-2142.0	-4427.2	143.2	-637.5	-1859.6	584.7
\$250k - \$500k	33.4	-40.7	107.6	12.7	-35.1	60.4
\$500k - \$750k	-2.6	-20.6	15.3	8.6	-7.4	24.6
\$750k - \$1m	6.6	-7.4	20.6	7.9	-0.9	16.8
\$1m - \$2.5m	3.8	-2.2	9.9	3.9	-1.2	9.1
\$2.5m - \$5m	<b>7.3*</b>	5.1	9.5	<b>6.2*</b>	4.7	7.7
\$5m - \$10m	<b>6.6*</b>	4.0	9.3	<b>7.3*</b>	4.9	9.6
\$10m - \$20m	-1.1	-3.4	1.3	0.7	-1.2	2.6
\$20m - \$50m	<b>11.5*</b>	7.9	15.1	0.0	0.0	0.0

**Table A3.1 (Continued): Estimated cumulative impact of EMDG + TS on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Employment (%)</b>						
\$0 - \$250k	-5.5	-21.9	11.0	-5.4	-19.4	8.5
\$250k - \$500k	<b>18.2*</b>	2.0	34.4	<b>18.9*</b>	5.9	31.8
\$500k - \$750k	<b>17.1*</b>	3.8	30.4	<b>22.1*</b>	10.5	33.6
\$750k - \$1m	9.4	-4.9	23.6	9.0	-3.5	21.4
\$1m - \$2.5m	<b>18.0*</b>	9.9	26.0	<b>23.2*</b>	16.3	30.1
\$2.5m - \$5m	<b>10.9*</b>	0.6	21.3	<b>23.1*</b>	14.9	31.2
\$5m - \$10m	<b>25.9*</b>	16.5	35.3	<b>22.8*</b>	14.8	30.8
\$10m - \$20m	<b>25.8*</b>	11.4	40.2	11.9	-0.2	23.9
\$20m - \$50m	<b>19.0*</b>	1.0	36.9	<b>16.4*</b>	0.9	31.9
<b>Labour Productivity (%)</b>						
\$0 - \$250k	24.5	-28.9	77.8	3.6	-41.6	48.9
\$250k - \$500k	-6.7	-53.2	39.9	9.2	-29.3	47.6
\$500k - \$750k	18.4	-14.9	51.7	23.3	-5.4	51.9
\$750k - \$1m	-2.7	-34.0	28.7	-18.4	-46.1	9.4
\$1m - \$2.5m	16.6	-2.3	35.5	<b>15.9*</b>	1.0	30.7
\$2.5m - \$5m	7.8	-8.7	24.3	-1.8	-16.2	12.6
\$5m - \$10m	5.8	-10.1	21.7	7.0	-7.4	21.3
\$10m - \$20m	-22.7	-48.1	2.7	-3.1	-24.4	18.3
\$20m - \$50m	-16.4	-42.7	10.0	2.8	-18.0	23.7
<b>Capital Productivity (%)</b>						
\$0 - \$250k	-34.9	-129.5	59.7	-23.7	-99.0	51.6
\$250k - \$500k	41.8	-38.1	121.6	5.5	-65.8	76.9
\$500k - \$750k	12.1	-54.8	79.0	28.0	-31.0	86.9
\$750k - \$1m	6.7	-58.6	72.0	-7.2	-66.0	51.6
\$1m - \$2.5m	14.2	-22.5	50.9	6.4	-24.4	37.3
\$2.5m - \$5m	-2.0	-40.0	35.9	-13.3	-46.0	19.4
\$5m - \$10m	3.3	-33.7	40.4	4.7	-27.0	36.4
\$10m - \$20m	-1.9	-64.1	60.4	-3.8	-56.9	49.2
\$20m - \$50m	<b>100.2*</b>	20.4	179.9	<b>111.5*</b>	44.7	178.4

**Table A3.1 (Continued): Estimated cumulative impact of EMDG + TS on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Survival Probability (% points)</b>						
\$0 - \$250k	<b>13.9*</b>	2.1	25.6	<b>21.8*</b>	6.3	37.3
\$250k - \$500k	12.7	-0.4	25.7	9.2	-2.6	21.1
\$500k - \$750k	6.0	-3.4	15.5	7.9	-2.5	18.3
\$750k - \$1m	N/A			N/A		
\$1m - \$2.5m	2.6	-1.9	7.0	<b>6.7*</b>	0.5	12.9
\$2.5m - \$5m	3.6	-2.0	9.3	<b>7.6*</b>	0.4	14.7
\$5m - \$10m	N/A			N/A		
\$10m - \$20m	N/A			N/A		
\$20m - \$50m	N/A			N/A		
<b>Export Survival Hazard (% points)</b>						
\$0 - \$250k	-9.8	-16.1	-3.5	-0.5	-5.8	4.8
\$250k - \$500k	<b>18.8*</b>	13.1	24.6	<b>15.8*</b>	11.3	20.2
\$500k - \$750k	<b>11.2*</b>	3.0	19.3	<b>13.4*</b>	7.4	19.4
\$750k - \$1m	<b>14.9*</b>	9.3	20.6	<b>6.6*</b>	1.6	11.5
\$1m - \$2.5m	<b>19.0*</b>	16.4	21.7	<b>16.4*</b>	14.6	18.3
\$2.5m - \$5m	<b>5.3*</b>	2.5	8.0	<b>12.2*</b>	10.0	14.3
\$5m - \$10m	<b>12.9*</b>	11.2	14.5	<b>16.9*</b>	15.3	18.4
\$10m - \$20m	<b>23.7*</b>	22.0	25.4	<b>22.3*</b>	20.9	23.8
\$20m - \$50m	<b>15.7*</b>	13.4	17.9	<b>12.8*</b>	11.4	14.2

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving general services, but no other Austrade service. “No Matching” uses all firms seeking general services, excluding those also receiving any other Austrade service. “1NN Matching” uses one nearest neighbour propensity score matched general service firms as a control for each firm receiving an EMDG, while “5NN Matching” uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Bands are based on average pre-treatment real turnover in 2002 dollars. “N/A” indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated.



### **A3.2 Results for Population Control Group**

In both sets of treatment groups, EMDG Only and EMDG + Tailored Services (EMDG + TS), we explored two difference-in-differences models which varied the control group to estimate the impact of the Austrade programs. The EMDG Only treatment contains only firms which had qualifying EMDG expenditures between the 2012-13 and 2016-17 financial years and excludes those receiving any other treatment, while the EMDG + TS treatment contains only those firms that received both an EMDG and tailored services from Austrade.

All control groups were based on organisations which were chosen from the pool of all Australian firms, conditional on never having any contracted service with Austrade. Unlike in the main results, we omitted the model with no matching due to length of time it took to estimate these models within BLADE. Thus, all models used a matched control group based on nearest-neighbour propensity score matching. Organisations in the control group are allowed to be matched to multiple treated organisations. We matched on both one and five nearest neighbours respectively.

The following tables break down the results using the control groups constructed from the pool of firms in the population of Australian firms with no connection to Austrade in a similar manner as those results found in Section 5. Table A3.2 reports the primary results and is comparable to Table 5.1. Tables A3.3, A3.4, and A3.5 report the results by the three major economic sectors: Resources, Manufacturing and Services. They are comparable to Tables 5.2, 5.3 and 5.4. Table A3.6 reports the estimates by pre-treatment turnover bands for the EMDG-Only treatment and is comparable to Table 5.5. Lastly, Table A3.7 reports the estimates by turnover band for the EMDG + TS treatment group and is comparable to the results in Table A3.1.

**Table A3.2: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
1NN Matching	<b>237.3*</b>	227.6	247.0	<b>286.6*</b>	260.0	313.1
5NN Matching	<b>272.6*</b>	265.0	280.2	<b>322.6*</b>	302.4	342.8
<b>Export Participation (% Points)</b>						
1NN Matching	<b>39.1*</b>	37.3	40.9	<b>45.3*</b>	40.9	49.8
5NN Matching	<b>45.8*</b>	44.2	47.4	<b>49.4*</b>	45.5	53.3
<b>Export Intensity (Share Sales)</b>						
1NN Matching	20.2	-1.4	41.9	3.6	-70.0	77.2
5NN Matching	53.5	-96.4	203.3	0.0	0.0	0.0
<b>Employment (%)</b>						
1NN Matching	<b>21.6*</b>	20.0	23.2	<b>33.2*</b>	29.1	37.4
5NN Matching	<b>26.5*</b>	25.3	27.7	<b>38.7*</b>	35.6	41.7
<b>Labour Productivity (%)</b>						
1NN Matching	1.7	-1.6	4.9	4.4	-3.8	12.5
5NN Matching	1.0	-1.6	3.7	<b>6.6*</b>	0.4	12.9
<b>Capital Productivity (%)</b>						
1NN Matching	4.3	-2.3	10.9	-16.1	-34.5	2.4
5NN Matching	3.2	-2.1	8.6	-7.9	-21.9	6.0
<b>Survival Probability (% points)</b>						
1NN Matching	<b>39.7*</b>	38.4	41.0	<b>43.5*</b>	38.6	48.3
5NN Matching	<b>58.6*</b>	56.3	60.9	<b>67.7*</b>	58.9	76.4

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information.

**Table A3.3: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in Resources**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
1NN Matching	<b>299.0*</b>	247.9	350.1	<b>462.2*</b>	344.7	579.7
5NN Matching	<b>295.0*</b>	257.5	332.5	<b>528.7*</b>	445.5	611.9
<b>Export Participation (% Points)</b>						
1NN Matching	<b>47.9*</b>	37.1	58.8	<b>63.7*</b>	46.4	81.1
5NN Matching	<b>54.9*</b>	46.7	63.0	<b>64.7*</b>	49.9	79.4
<b>Export Intensity (Share Sales)</b>						
1NN Matching	65.6	-81.6	212.8	<b>14.9*</b>	8.3	21.4
5NN Matching	114.1	-80.2	308.4	<b>20.1*</b>	14.4	25.8
<b>Employment (%)</b>						
1NN Matching	<b>20.5*</b>	11.3	29.7	<b>28.4*</b>	7.9	48.8
5NN Matching	<b>23.3*</b>	16.3	30.3	<b>47.0*</b>	31.1	62.8
<b>Labour Productivity (%)</b>						
1NN Matching	1.7	-17.8	21.3	9.8	-24.5	44.1
5NN Matching	-3.1	-17.8	11.7	19.9	-6.6	46.4
<b>Capital Productivity (%)</b>						
1NN Matching	8.0	-29.9	45.9	-8.4	-85.8	69.0
5NN Matching	20.7	-6.8	48.2	-41.5	-97.6	14.6
<b>Survival Probability (% points)</b>						
1NN Matching	<b>40.9*</b>	33.5	48.4	N/A		
5NN Matching	<b>53.5*</b>	40.6	66.5	N/A		

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information. Firms are classified as resources if they are classified as "A" or "B" in the ANZSIC (2006) classifications. "N/A" indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated.

**Table A3.4: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in Manufacturing**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
1NN Matching	<b>309.1*</b>	284.8	333.4	<b>338.4*</b>	281.3	395.4
5NN Matching	<b>347.6*</b>	328.0	367.2	<b>394.9*</b>	348.7	441.2
<b>Export Participation (% Points)</b>						
1NN Matching	<b>48.5*</b>	44.0	53.1	<b>65.7*</b>	48.3	83.2
5NN Matching	<b>53.3*</b>	49.3	57.2	<b>87.5*</b>	72.6	102.4
<b>Export Intensity (Share Sales)</b>						
1NN Matching	36.0	-120.1	192.1	<b>5.2*</b>	2.4	8.1
5NN Matching	-5.2	-86.5	76.0	<b>8.1*</b>	2.2	14.0
<b>Employment (%)</b>						
1NN Matching	<b>21.0*</b>	17.4	24.6	<b>38.7*</b>	30.1	47.2
5NN Matching	<b>29.6*</b>	26.7	32.5	<b>45.4*</b>	38.8	52.1
<b>Labour Productivity (%)</b>						
1NN Matching	1.1	-4.9	7.0	-1.1	-13.8	11.6
5NN Matching	2.8	-2.0	7.6	-3.8	-13.8	6.3
<b>Capital Productivity (%)</b>						
1NN Matching	-0.3	-15.7	15.0	6.7	-29.4	42.9
5NN Matching	1.6	-11.1	14.2	9.2	-20.0	38.5
<b>Survival Probability (% points)</b>						
1NN Matching	<b>37.7*</b>	34.3	41.1	<b>42.1*</b>	32.6	51.6
5NN Matching	<b>58.3*</b>	52.7	63.9	<b>58.2*</b>	41.4	74.9

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information. Firms are classified as manufacturing if they are classified as "C" in the ANZSIC (2006) classifications.

**Table A3.5: Estimated cumulative impact of EMDGs 2012-13 to 2016-17 on firm performance in Services**

	EMDG Only			EMDG + TS		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
1NN Matching	<b>217.8*</b>	207.0	228.6	<b>262.3*</b>	231.4	293.1
5NN Matching	<b>255.0*</b>	246.5	263.4	<b>292.8*</b>	269.1	316.6
<b>Export Participation (% Points)</b>						
1NN Matching	<b>36.2*</b>	34.1	38.3	<b>40.8*</b>	35.7	46.0
5NN Matching	<b>44.5*</b>	42.7	46.2	<b>45.3*</b>	40.9	49.7
<b>Export Intensity (Share Sales)</b>						
1NN Matching	154.8	-318.2	627.7	1.8	-16.4	20.0
5NN Matching	72.4	-171.0	315.9	274.7	-947.6	1497.0
<b>Employment (%)</b>						
1NN Matching	<b>22.2*</b>	20.5	24.0	<b>27.9*</b>	23.2	32.5
5NN Matching	<b>25.4*</b>	24.0	26.8	<b>38.0*</b>	34.6	41.5
<b>Labour Productivity (%)</b>						
1NN Matching	-3.8	-7.7	0.1	-4.9	-16.0	6.2
5NN Matching	-0.2	-3.3	3.0	-0.2	-8.6	8.2
<b>Capital Productivity (%)</b>						
1NN Matching	0.5	-6.8	7.8	-10.5	-30.3	9.4
5NN Matching	-1.2	-7.1	4.7	3.1	-12.4	18.7
<b>Survival Probability (% points)</b>						
1NN Matching	<b>39.5*</b>	38.0	41.0	<b>42.3*</b>	36.5	48.1
5NN Matching	<b>58.3*</b>	55.8	60.9	<b>67.3*</b>	57.0	77.6

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information. Firms are classified as services if they are not listed in "A", "B", or "C" in the ANZSIC (2006) classifications.

**Table A3.6: Estimated cumulative impact of EMDG Only on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
\$0 - \$250k	<b>297.2*</b>	276.7	317.7	<b>345.6*</b>	329.9	361.4
\$250k - \$500k	<b>274.7*</b>	248.6	300.7	<b>317.0*</b>	297.0	336.9
\$500k - \$750k	<b>257.0*</b>	225.8	288.2	<b>283.5*</b>	259.1	307.9
\$750k - \$1m	<b>243.6*</b>	206.8	280.3	<b>266.8*</b>	238.0	295.6
\$1m - \$2.5m	<b>238.3*</b>	217.3	259.3	<b>263.6*</b>	247.0	280.1
\$2.5m - \$5m	<b>194.7*</b>	166.9	222.4	<b>223.1*</b>	200.4	245.8
\$5m - \$10m	<b>180.8*</b>	147.6	214.0	<b>186.6*</b>	159.6	213.7
\$10m - \$20m	<b>156.2*</b>	117.2	195.1	<b>163.0*</b>	129.6	196.5
\$20m - \$50m	<b>96.9*</b>	29.1	164.8	<b>145.3*</b>	91.1	199.5
<b>Export Participation (% Points)</b>						
\$0 - \$250k	<b>45.2*</b>	40.9	49.5	<b>56.5*</b>	52.3	60.7
\$250k - \$500k	<b>36.7*</b>	31.1	42.2	<b>50.9*</b>	46.9	54.9
\$500k - \$750k	<b>41.1*</b>	34.9	47.3	<b>46.7*</b>	41.6	51.8
\$750k - \$1m	<b>32.7*</b>	25.0	40.4	<b>42.3*</b>	36.4	48.2
\$1m - \$2.5m	<b>37.0*</b>	33.0	41.1	<b>44.3*</b>	40.9	47.8
\$2.5m - \$5m	<b>29.5*</b>	24.2	34.8	<b>36.5*</b>	32.0	41.0
\$5m - \$10m	<b>30.6*</b>	24.3	36.9	<b>31.6*</b>	26.2	37.1
\$10m - \$20m	<b>36.1*</b>	27.0	45.2	<b>34.1*</b>	26.2	42.0
\$20m - \$50m	<b>24.5*</b>	8.9	40.1	<b>29.1*</b>	16.9	41.3
<b>Export Intensity (Share Sales)</b>						
\$0 - \$250k	-16.8	-88.4	54.7	0.0	-191.1	191.0
\$250k - \$500k	31.1	-10.2	72.4	<b>34.9*</b>	3.9	66.0
\$500k - \$750k	10.9	-10.5	32.3	25.0	-41.6	91.6
\$750k - \$1m	218.7	-38.5	476.0	<b>261.8*</b>	133.8	389.9
\$1m - \$2.5m	<b>3.1*</b>	0.8	5.5	4.2	-1.3	9.7
\$2.5m - \$5m	<b>2.9*</b>	1.1	4.8	<b>3.2*</b>	1.9	4.5
\$5m - \$10m	27.3	-36.5	91.1	6.3	-26.8	39.4
\$10m - \$20m	1.9	-7.3	11.2	2.8	-2.9	8.4
\$20m - \$50m	<b>3.5*</b>	2.0	5.1	<b>4.1*</b>	2.9	5.4

**Table A3.6 (Continued): Estimated cumulative impact of EMDG Only on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Employment (%)</b>						
\$0 - \$250k	<b>24.8*</b>	21.4	28.1	<b>25.9</b>	23.4	28.4
\$250k - \$500k	<b>17.9*</b>	13.8	22.0	<b>21.5</b>	18.4	24.6
\$500k - \$750k	<b>30.6*</b>	25.8	35.4	<b>32.0</b>	28.3	35.7
\$750k - \$1m	<b>26.2*</b>	20.6	31.7	<b>33.5</b>	29.1	38.0
\$1m - \$2.5m	<b>23.5*</b>	20.2	26.8	<b>30.7</b>	28.1	33.3
\$2.5m - \$5m	<b>21.0*</b>	16.7	25.3	<b>26.9</b>	23.4	30.4
\$5m - \$10m	<b>18.9*</b>	13.7	24.1	<b>17.2</b>	13.0	21.4
\$10m - \$20m	<b>11.6*</b>	5.1	18.1	<b>16.7</b>	11.2	22.1
\$20m - \$50m	-1.8	-14.1	10.5	1.8	-7.1	10.7
<b>Labour Productivity (%)</b>						
\$0 - \$250k	-5.3	-18.6	8.0	-4.9	-14.9	5.1
\$250k - \$500k	-2.7	-13.4	8.0	0.9	-7.5	9.3
\$500k - \$750k	-1.3	-12.0	9.5	5.4	-3.0	13.9
\$750k - \$1m	3.7	-8.8	16.1	-0.7	-10.3	8.9
\$1m - \$2.5m	1.1	-5.0	7.2	-0.7	-5.6	4.2
\$2.5m - \$5m	2.2	-5.1	9.5	3.6	-2.6	9.8
\$5m - \$10m	6.8	-1.4	15.1	5.6	-1.4	12.5
\$10m - \$20m	-11.4	-22.1	-0.6	-5.9	-14.7	3.0
\$20m - \$50m	1.7	-17.3	20.7	-4.9	-19.3	9.6
<b>Capital Productivity (%)</b>						
\$0 - \$250k	-28.1	-50.2	-6.1	-14.3	-31.5	2.8
\$250k - \$500k	3.0	-15.0	21.0	5.8	-9.7	21.3
\$500k - \$750k	-15.6	-37.1	5.9	-7.6	-24.5	9.2
\$750k - \$1m	16.0	-7.3	39.2	8.2	-10.4	26.8
\$1m - \$2.5m	-4.7	-16.9	7.4	-7.8	-18.0	2.3
\$2.5m - \$5m	12.7	-3.8	29.1	1.8	-11.8	15.3
\$5m - \$10m	6.1	-13.1	25.3	4.6	-11.4	20.5
\$10m - \$20m	20.1	-5.3	45.4	15.8	-4.2	35.8
\$20m - \$50m	18.0	-24.4	60.4	33.1	-1.2	67.4

**Table A3.6 (Continued): Estimated cumulative impact of EMDG Only on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Survival Probability (% points)</b>						
\$0 - \$250k	<b>41.6*</b>	39.0	44.1	<b>62.1*</b>	57.6	66.7
\$250k - \$500k	<b>31.2*</b>	27.3	35.1	<b>47.0*</b>	41.5	52.5
\$500k - \$750k	<b>33.8*</b>	28.8	38.7	<b>48.5*</b>	40.9	56.1
\$750k - \$1m	<b>35.0*</b>	28.5	41.4	<b>54.0*</b>	43.5	64.4
\$1m - \$2.5m	<b>30.3*</b>	26.9	33.7	<b>45.9*</b>	40.9	51.0
\$2.5m - \$5m	<b>30.7*</b>	25.9	35.5	<b>49.2*</b>	41.9	56.6
\$5m - \$10m	<b>31.6*</b>	26.6	36.7	<b>44.1*</b>	36.8	51.4
\$10m - \$20m	<b>31.6*</b>	24.7	38.4	<b>44.2*</b>	34.3	54.2
\$20m - \$50m	<b>32.1*</b>	22.1	42.1	<b>45.0*</b>	32.1	57.9

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year that the firm had an eligible EMDG expense and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information. Bands are based on average pre-treatment real turnover in 2002 dollars. "N/A" indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated.



**Table A3.7: Estimated cumulative impact of EMDG + TS on firm performance by Turnover Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Export Sales (%)</b>						
\$0 - \$250k	<b>263.4*</b>	183.1	343.7	<b>225.7*</b>	161.9	289.6
\$250k - \$500k	<b>449.2*</b>	345.8	552.6	<b>461.6*</b>	382.9	540.3
\$500k - \$750k	<b>426.7*</b>	338.5	514.9	<b>410.7*</b>	340.7	480.8
\$750k - \$1m	<b>388.2*</b>	275.6	500.8	<b>418.1*</b>	335.2	500.9
\$1m - \$2.5m	<b>254.5*</b>	197.0	311.9	<b>287.9*</b>	242.7	333.0
\$2.5m - \$5m	<b>326.6*</b>	262.1	391.1	<b>360.2*</b>	309.5	410.8
\$5m - \$10m	<b>287.1*</b>	220.5	353.7	<b>300.7*</b>	246.8	354.5
\$10m - \$20m	<b>247.1*</b>	150.1	344.1	<b>203.4*</b>	123.8	283.0
\$20m - \$50m	<b>158.5*</b>	38.7	278.3	<b>268.1*</b>	173.7	362.5
<b>Export Participation (% Points)</b>						
\$0 - \$250k	<b>57.6*</b>	42.0	73.2	<b>50.3*</b>	36.3	64.4
\$250k - \$500k	<b>62.0*</b>	47.8	76.1	<b>66.3*</b>	51.4	81.2
\$500k - \$750k	<b>54.4*</b>	42.4	66.5	<b>56.3*</b>	45.3	67.2
\$750k - \$1m	<b>52.9*</b>	34.0	71.9	<b>61.5*</b>	44.4	78.7
\$1m - \$2.5m	<b>37.7*</b>	28.2	47.3	<b>45.5*</b>	37.2	53.9
\$2.5m - \$5m	<b>44.8*</b>	33.8	55.9	<b>53.2*</b>	43.7	62.7
\$5m - \$10m	<b>47.4*</b>	35.4	59.3	<b>46.8*</b>	35.9	57.8
\$10m - \$20m	<b>32.4*</b>	13.8	50.9	<b>24.6*</b>	8.4	40.9
\$20m - \$50m	24.6	-2.1	51.3	<b>47.5*</b>	25.9	69.2
<b>Export Intensity (Share Sales)</b>						
\$0 - \$250k	-2.2	-862.7	858.2	-16.8	-430.6	396.9
\$250k - \$500k	-1.7	-15.3	11.9	9.5	-13.1	32.1
\$500k - \$750k	5.0	-7.5	17.6	6.4	-0.3	13.2
\$750k - \$1m	4.4	-11.9	20.7	<b>9.4*</b>	1.6	17.3
\$1m - \$2.5m	1.3	-3.9	6.5	2.4	-0.2	5.0
\$2.5m - \$5m	<b>5.5</b>	3.3	7.6	<b>6.9*</b>	4.3	9.4
\$5m - \$10m	-57.7	-137.8	22.4	-8.3	-46.5	30.0
\$10m - \$20m	<b>4.4*</b>	2.1	6.6	<b>5.2*</b>	0.8	9.7
\$20m - \$50m	<b>8.2*</b>	4.7	11.7	<b>8.2*</b>	6.0	10.3

**Table A3.7 (Continued): Estimated cumulative impact of EMDG + TS on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Employment (%)</b>						
\$0 - \$250k	1.6	-14.6	17.9	7.9	-3.6	19.4
\$250k - \$500k	<b>35.4*</b>	21.7	49.1	<b>36.9*</b>	26.6	47.1
\$500k - \$750k	<b>33.1*</b>	20.2	46.0	<b>42.5*</b>	32.8	52.1
\$750k - \$1m	<b>45.6*</b>	29.3	61.9	<b>27.4*</b>	15.6	39.1
\$1m - \$2.5m	<b>42.0*</b>	34.2	49.9	<b>43.3*</b>	36.9	49.7
\$2.5m - \$5m	<b>28.6*</b>	18.4	38.8	<b>37.5*</b>	30.2	44.9
\$5m - \$10m	<b>43.6*</b>	33.1	54.2	<b>36.0*</b>	27.7	44.3
\$10m - \$20m	<b>34.7*</b>	19.5	49.9	<b>36.9*</b>	25.3	48.5
\$20m - \$50m	<b>26.9*</b>	9.4	44.4	<b>46.2*</b>	29.0	63.3
<b>Labour Productivity (%)</b>						
\$0 - \$250k	23.7	-37.3	84.7	11.9	-30.4	54.2
\$250k - \$500k	-35.1	-78.5	8.3	-2.6	-34.9	29.7
\$500k - \$750k	<b>36.8*</b>	4.6	68.9	<b>28.7*</b>	5.5	51.9
\$750k - \$1m	-4.3	-36.0	27.4	-10.9	-34.6	12.9
\$1m - \$2.5m	4.0	-12.9	21.0	<b>16.5*</b>	2.8	30.2
\$2.5m - \$5m	-3.2	-22.0	15.7	3.2	-11.2	17.6
\$5m - \$10m	1.1	-15.1	17.4	6.6	-6.3	19.6
\$10m - \$20m	-16.4	-40.7	7.8	-18.7	-36.8	-0.6
\$20m - \$50m	5.4	-20.5	31.2	-0.4	-25.5	24.6
<b>Capital Productivity (%)</b>						
\$0 - \$250k	61.1	-33.2	155.5	-15.8	-80.1	48.6
\$250k - \$500k	8.8	-57.7	75.3	-0.6	-53.7	52.4
\$500k - \$750k	3.9	-55.3	63.1	-10.9	-58.8	37.0
\$750k - \$1m	66.0	-5.6	137.6	-15.6	-68.3	37.2
\$1m - \$2.5m	31.5	-4.9	68.0	<b>29.1*</b>	1.3	57.0
\$2.5m - \$5m	-30.8	-73.6	12.1	-22.4	-53.8	9.0
\$5m - \$10m	14.3	-25.0	53.6	-3.0	-34.2	28.2
\$10m - \$20m	-39.7	-110.5	31.1	-48.1	-96.7	0.5
\$20m - \$50m	<b>99.0*</b>	23.9	174.0	<b>89.8*</b>	31.1	148.6

**Table A3.7 (Continued): Estimated cumulative impact of EMDG + TS on firm performance by Turnover**

**Band**

	1NN Matching			5NN Matching		
	Average	Lower	Upper	Average	Lower	Upper
<b>Survival Probability (% points)</b>						
\$0 - \$250k	<b>49.2*</b>	38.2	60.2	<b>72.5*</b>	48.1	96.8
\$250k - \$500k	<b>37.5*</b>	22.3	52.7	<b>48.0*</b>	24.0	71.9
\$500k - \$750k	<b>27.5*</b>	12.7	42.2	<b>55.6*</b>	31.8	79.4
\$750k - \$1m	N/A			N/A		
\$1m - \$2.5m	<b>43.6*</b>	34.3	53.0	<b>56.7*</b>	40.1	73.3
\$2.5m - \$5m	<b>35.4*</b>	24.9	45.9	<b>47.1*</b>	31.0	63.3
\$5m - \$10m	N/A			N/A		
\$10m - \$20m	N/A			N/A		
\$20m - \$50m	N/A			N/A		

Notes: Estimates that are bold and have \* are statistically different than zero at the 5 per cent level of significance or lower. Estimates are based on difference-in-differences analysis of participating firms compared to organisations receiving no Austrade service. "1NN Matching" uses one nearest neighbour propensity score matched firms with no Austrade contact as a control for each firm receiving an EMDG, while "5NN Matching" uses five nearest neighbour propensity score matched firms. A firm in the control group can be matched to multiple treatment firms. Lower and upper bounds (Lower 95%-CI and Upper 95%-CI) are estimated 95% confidence intervals. Treatment for an EMDG + TS is a cumulative effect where the binary variable is equal to one beginning in the first fiscal year in which a firm either had an eligible EMDG expense or had a tailored service and zero otherwise. Export survival was omitted due to the potential for revealing firm-level information. "N/A" indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated. Bands are based on average pre-treatment real turnover in 2002 dollars. "N/A" indicates the model was not able to be estimated due to the lack of firm failures in the treatment group for the subcategory being estimated.

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## Glossary

Confidence interval	A 95% confidence interval means that if the analysis is replicated with 100 times with possibly different samples, the true value of the population parameter of interest (the impact of tailored services) will be observed in the interval 95 times.
Control group	The control group consists of firms who did not participate in the program, but are otherwise similar to the participating firms. To obtain unbiased impact estimates, the average change in the relevant outcomes of participating firms is compared to the average change in the same outcomes of the firms in the control group. There are two control groups in this study. The first are firms that have received general services from Austrade, but have otherwise have not received any tailored services. The second control group is built from a pool of all economically active firms.
Counterfactual	In program impact evaluation with observational data, the counterfactuals refer to the unobserved outcomes of participants had they not participated in the programs.
Cumulative Impact	The estimated change in the outcome variable comparing the first and subsequent fiscal years that a firm received tailored services to the fiscal years prior to receiving tailored services.
Difference-in-differences	An empirical technique to account for potential selection into treatment bias when treatment effect is to be estimated with non-experimental data. Instead of taking average difference in outcomes of treatment and control groups to measure treatment effect, difference-in-differences (also known as DID) takes the difference between the average change in outcomes of the treatment group and the average change in outcomes of the control group.
Economically Active Firm	Defined by CTI as firms that have non-zero sales or non-zero employee headcount.
Economically significant	This concept concerns with the magnitude of the impacts and to be contrasted with the concept of statistical significance. An estimated impact may be statistically significantly different from zero. However, the magnitude of the impact may be too small to be

considered as significant in economic terms. This is also known as importance measure.

Export Intensity	The ratio of aggregated export sales to total firm sales.
Immediate Impact	The estimated change in the outcome variable comparing only the fiscal year in which the firm received tailored services compared to the performance of the firm in all other fiscal years.
Impact	In this evaluation, impact is defined as the change in the export performance (export revenue and export participation) of EMDG recipients.
Lower bound	Lower bound refers to the lower limit of any reported 95% confidence intervals.
Matching	In this evaluation, matching is a data driven approach to ensure two given firms are “similar” to each other in the matching characteristics or in terms of the probability to be in the treatment group.
Naïve estimate	In this evaluation, naïve estimate refers to impact estimates derived from a simple difference between export performance before and after program participation or between export performance of participants and non-participants.
Probability of export	This evaluation defines a firm as an exporter in a given financial year if it reports a positive export value in its Business Activity Statement. The probability of export is probability of a firm in the sample has positive export. Empirically, this probability is approximated by the proportion of firms who are exporters.
Propensity score	Propensity score in this evaluation refers to the predicted probability of a given firm is receiving Austrade tailored services, conditional on firms observed characteristics.
Propensity score matching	This refers to matching based on a comparison of the propensity score defined above. Two firms are matched if their propensity scores match.
Robust estimate	This concept refers that the estimates are robust to variation in model specifications.



Treatment group	In this evaluation, treatment group refers to participating organisations receiving EMDG with and without the tailored services.
Time invariant factors	Factors which values are fixed/constant across time.
Unobserved factors	In this evaluation, they refer to factors which are not recorded in the data but they determine whether or not a firm participated in the program and are correlated with the outcomes being evaluated. This may include managerial posture, technological or political opportunities <i>inter alia</i> .