Honours Thesis

International Trade and Job Polarisation:

Are all the middle-waged jobs disappearing?

Jason P. Maxted

supervised by

Dr. Richard Pomfret

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Declaration

Except where appropriately acknowledged this thesis is my own work, has been expressed in my own words and has not previously been submitted for assessment.

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Abstract

This thesis investigates the influence that international trade exposure has on the composition of the labour force in the manufacturing sector in Australia between 2008 and 2013. In particular we investigate whether the phenomenon of job polarisation is present within the industry, and whether increased trade exposure contributes to this. Thus we have had to carefully map employment data with trade data. Our panel data fixed effects estimation suggests that job polarisation does not exist within the manufacturing sector. This does not rule out its existence when accounting for the entire labour force however. The most significant finding is that increased exposure to trade leads to a movement of labour down the wage distribution. Such a finding has the potential to have significant policy implications.

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1 Introduction

Job polarisation is the phenomenon in which the labour market experiences an increase in the share of bad jobs and an increase in the share of good jobs, but a decrease in the share of jobs in between. It is just one pattern of labour movement that international trade exposure has been theorised to exacerbate. Other trade-induced labour movements will be discussed in the literature review. The measurement of the quality of a job can be done using many alternative approaches but for this thesis, wage will be used to indicate quality. Evidence of this 'hollowing out' of the labour market has been observed in many developed countries including the United States, Denmark, Britain and much of Western Europe. One particular hypothesis that has been used to explain the occurrence is that medium quality jobs have the tendency to be more routine in their tasks and as such are most likely to be replaced by technology, displacing workers into the tails of the job quality distribution (Autor et al. 2003). This is known as the routinisation hypothesis. Another explanation is that globalisation has contributed to job polarisation as these medium quality jobs are more susceptible to being off-shored, again leading to the displacement of the labour force (Goos and Manning 2007). Furthermore, import competition has also been hypothesised to lead to a decrease in demand for workers specifically concentrated in the middle of the job quality distribution (Keller and Utar 2016). This thesis will examine the latter, that being the influence of international trade on labour market composition.

The focus of the analysis will be the Australian manufacturing industry over six years from 2008 to 2013. Traditionally it has been argued that the manufacturing sector has an important role in the explanation of job polarisation. This is noted by Keller and Utar (2016) as manufacturing jobs are typically middle waged occupations. And as many developed countries have seen a decline in the share of workers in the manufacturing sector, largely due to off-shoring, these workers are then forced into other jobs which are often of differing quality (Keller and Utar 2016). Thus they tend to move up or down the wage distribution. Between 2008 and 2013 employment in the Australian manufacturing sector had not only decreased in terms of share of the labour force, but it has also seen a nominal decrease in employment of approximately 15% (Australian Bureau of Statistics 2015).

This thesis opts to slightly alter the focus of analysis and instead will solely look at the manufacturing industry. Firstly it will be determined whether labour market polarisation exists within the manufacturing sector. And secondly whether international trade influences any movement of labour within manufacturing in Australia. A previous study from Keller and Utar (2016) found there not to be job polarisation within the Danish manufacturing sector, and instead it only existed when taking into account the entire labour force. Nevertheless we will enquire as to its presence in the Australian manufacturing sector. It should also be mentioned that a benefit of conducting an analysis from the manufacturing industry perspective is that it is traditionally one of the most traded sectors (Lake and Millimet 2016). The following graph displays how each disaggregated manufacturing industry analysed has changed in employment share from 2008 to 2013.

Data sourced from the Australian Burueau of Statistics, 2015

For job polarisation to be confirmed there should be increases in employment shares at the tails of the distribution and a decline in the middle. This is not obvious in the graph and is an initial indication that it may not be a phenomenon within the Australian manufacturing sector. However average wage per industry here is measured at 2008 levels and

does not allow for changes in wages over time. This displays how using a cross-sectional model can be misleading. As will be discussed later, we allow for such changes in wages in industries by using a panel data model. This is a major contribution to the literature as most previous work does not capture changes in job quality over time. Another contribution to the literature is that there has been limited attention paid to trade-induced movement of labour within manufacturing as well as minimal recent research devoted to polarisation of the Australian labour market.

The existence of job polarisation signals increasing inequality. This is why study of the phenomenon is considered to be important (Keller and Utar 2016). There are potential policy implications for international trade if it is determined that it is exacerbating inequality. For example it can lead to disagreements between people who benefit and those who lose from the labour market changes. Similarly if job polarisation does not exist in the manufacturing sector but trade impacts upon the composition of the labour force, there are again implications for policy makers. This will be discussed further at a later stage. The structure for the remainder of the thesis is that a literature review immediately follows, after which there will be sections devoted to description of the data, an outline of the model, a description of the variables, the empirical results and a subsequent discussion.

2 Literature Review

The notion of job polarisation in developed countries is not an entirely new sensation as the trend is noticeable as early back as the 1970s, as observed by Goos and Manning (2007). However the trend, like all trends, takes time to be noticed and thus polarisation of the labour market has only become identified and analysed relatively recently. Goos and Manning (2007) explore the entire labour market in Britain between 1975 and 1999 and observe a distinct reduction in the share of jobs within the middle of the wage distribution. Their argument for the structural change in the labour market echoes the notion of Autor, Levy and Murnane (2003) that technology is responsible for this polarisation. The reasoning for such a claim is that all jobs fall into one of three categories. Non-routine tasks that are complementary to technology such as professional jobs. These appear in the upper part of the wage distribution. Next are routine tasks such as bookkeeping. These are concentrated within the middle of the income distribution as the moderate level of precision required to perform these tasks ensures they are not within the low wage bracket. And finally non-routine manual tasks not directly influenced by technology such as cleaning that occupy the lowest wage group (Autor et al. 2003). Ultimately due to the structured nature of routine tasks they are the most suited to becoming redundant as human labour is substituted with technology. This theory is the most commonly recognised alternative proposal to trade for the main cause of job polarisation. However as Goos and Manning (2007) later concede, trade and technology are not necessarily competing explanations for the phenomenon. They further note that the jobs that can be routinised are the ones that are most likely to be moved overseas.

Keller and Utar (2016) specifically look at the influence of trade on job polarisation. Their research of the Danish labour market between 1999 and 2009 finds that import competition from China has led to job polarisation through the shift from manufacturing towards services domestically. They also note that offshoring and technical change play a role of the restructuring of the labour market, but to a lesser extent. Their explanation as to why increased import competition can lead to job polarisation is as follows. Production of traded goods intensively requires tasks that are performed by workers with moderate

skills, which are usually mid-level wage positions. Any increase in productivity within the traded goods sector overseas will increase foreign competitiveness and exports. Therefore domestically there will be a rise in the level of import competition and a decrease in the demand for these mid-level waged jobs (Keller and Utar 2016). As such these workers will be redistributed either to higher wage jobs or lower wage jobs. Keller and Utar (2016) declare which way they move on the wage distribution is influenced by their education level.

Lake and Millimet (2016) discover that the US labour market has also seen a disappearance in the share of middle-waged jobs. Their initial finding is that local import competition, measured by tariff reductions and import penetration from China, reduces employment growth in low-waged jobs but increases employment growth in high-waged jobs. Thus they conclude that globalisation in the US is responsible for reallocating workers upwards in the distribution of job quality, and not exacerbating polarisation. However when they reclassify jobs into three categories similar to what is done by Goos and Manning (2007), they find that an increase in local trade exposure does contribute to labour market polarisation. They label this occupational polarisation and distinguish it from job polarisation. Occupation in this sense is an aggregation of multiple jobs into the three broad categories previously mentioned. Conversely Keller and Utar (2016) find that despite the manufacturing sector being responsible for a high portion of mid-wage employment declines, there is no gain in employment in high-wage manufacturing jobs and in fact employment in low-wage manufacturing jobs has decreased. Hence they discover that there is no trade-induced polarisation within manufacturing in Denmark. This is an important finding and suggests job polarisation within the manufacturing sector in Australia is not necessarily expected.

A similar paper is written by Autor, Dorn and Hansen (2013). They look at the influence of rising Chinese import competition on the US labour market between 1990 and 2007. Specifically looking at the manufacturing industry they find that import competition is responsible for one quarter of the decline in US manufacturing employment (Autor et al. 2013). Furthermore the labour market in Japan is analysed by Kambayashi and Kato (2016). Popular narrative has claimed that the Japanese labour market has seen a movement towards 'bad' jobs over the past three decades. Kambayashi and Kato dispel

this notion and argue that there has been a movement between 'bad' jobs. Whilst not discussing job polarisation at length, they note that trade (in particular import penetration) is an influential factor in the change in composition of the labour market, but does not necessarily cause job polarisation.

There also exists some Australian literature on the topic of job polarisation, but perhaps not to the same extensive extent that exists abroad. Coelli and Borland (2015) analyse the Australian labour market over the period 1966-2011 and find that, particularly in the 1980s and 1990s, there is substantial evidence in support of the phenomenon of job polarisation. Their paper does not incorporate trade like some of the other literature and instead mainly focuses on the routinisation hypothesis first introduced by Autor, Levy and Murnane (2003). Ultimately Coelli and Borland (2015) conclude that the data that they observe supports the routinisation hypothesis. Another interesting finding of theirs is that job polarisation is mainly a male phenomenon. The proposal for this occurrence is that males were originally over represented in middle-skilled and middle-waged jobs.

3 Data Description

For the construction of this paper two sources of data were used. Firstly the employment and wage data was sourced from the Australian Bureau of Statistics (2015), catalogue number 8155.0 titled Australian Industry. The manufacturing subsection consists of 4-digit level industries, totalling 143 all together, and details the number of people employed within each industry, the industry value added by each industry, their respective sales and service incomes, as well as the total dollars spent on wages and salaries. Data is collected annually. The industries are classified according to the Australian and New Zealand Standard Industrial Classification (ANZSIC).

The second dataset is sourced from the United Nations Industrial Development Organisation (2016). It contains trade data on 75 countries worldwide at the 4-digit manufacturing level. Specific variables of the country-level annual measurements are as follows: output, apparent consumption, exports to industrialised countries, exports to developing countries, exports to the entire world, imports from developing countries, imports from industrialised countries, and imports from the entire world. The data availability for some countries and variables is imperfect. However the availability of data on countries' imports, the variable of interest for our model, is relatively good for the desired countries. The specific data source is titled 'Industrial Demand-Supply Balance Database'. There are 137 manufacturing categories, which are classified according to the International Standard Industrial Classification (ISIC) Revision four.

The two different classifications of manufacturing industries ensured that a method to match the data was necessary for an appropriate analysis to be conducted. It was subsequently required that there be just one classification for all variables so as to satisfy our model. This is a similar issue that was faced by Coelli and Borland (2015) where they discover a lack of one-to-one matches between their datasets for occupations. Unfortunately there is no perfect manner in which to map such data. The Australian Bureau of Statistics (ABS) provides correspondence tables between the two classifications as a means of conversion and comparison. Ultimately it was these conversion tables that allowed trade estimates to be determined and is discussed in more detail in the following section.

3.1 Data Mapping

As mentioned in the previous section, matching the trade data variables with the labour data variables to form a single, comparable dataset ensured some estimates were required to be made. The ABS correspondence tables resulted in a final total of 88 manufacturing industries remaining in the sample. The two primary reasons why this number is considerably lower than the original number of industries under both the ANZSIC and ISIC classifications are due to the non-availability of data within some of the industries, as well as the matching of some particular industries proving too unrealistic. The following industry mapping examples demonstrate the process that was used to correspond the ABS industries with the United Nations Industrial Development Organisation (UNIDO) industries.

Firstly below essentially demonstrates a "perfect match", where all the activities in the ISIC classification of 'Manufacture of Sugar' are contained within the ANZSIC classification of 'Sugar Manufacturing'. No other ISIC classifications are contained within this ANZSIC classification. This can be considered a direct match and is the ideal scenario. Therefore the trade variables under this ISIC classification are directly mapped to this ANZSIC classification with no adjustment required.

ANZSIC	ISIC
1181 Sugar Manufacturing	1072 Manufacture of Sugar

Table 1: Data Matching 1

The next example on the following page shows a partial match, denoted by p, between the ISIC and ANZSIC classification. This indicates that only part of the particular ISIC class (Manufacture of clay building materials) corresponds to the ANZSIC class of 'Clay Brick Manufacturing'. Nevertheless this is treated as a direct match as there is no reasonable alternative, since it is not clear as to the strength of the partial match. As a result it is important to note that these trade variables are estimates.

ANZSIC	ISIC
2021 Clay Brick Manufacturing	2392p Manufacture of clay building materials

Table 2: Data Matching 2

A third example can be seen next. Here there are two ISIC classes. Both only partly correspond to the ANZSIC class. To convert into a single ANZSIC class, the two ISIC class variables are simply added together. The method is used for when there are at most two partial ISIC classes per ANZSIC class. This is a necessary mapping rule to ensure there are a sufficient number of industries in the analysis. Also, importantly, it does not distort changes over time within an industry or between instrumental variables (which will be discussed later) as all years and IVs are measured in the same manner.

ANZSIC	ISIC
1171 Bread Manufacturing	1061p Manufacture of grain mill products 1071p Manufacture of bakery products

Table 3: Data Matching 3

Lastly is an example of an ANZSIC class that has not been included in the analysis. This is because it was not deemed appropriate to simply add all partial ISIC matches, because the high number of them is likely to overly inflate 'Medical and Surgical Equipment Manufacturing' trade figures. Consequently doing so would have been misleading.

ANZSIC	ISIC
2412 Medical and Surgical Equipment Manufacturing	2023p Soap and detergents, cleaning and polishing preparation 2593p Manufacture of cutlery, hand tools and general hardware 2651p Measuring, testing, Navigating and control equipment 2660p Irridiation, electromedical and electrotherapeutic equipment 2670p Optical instruments and photographic equipment 3250p Medical and dental instruments and supplies 3290p other manufacturing n.e.c

Table 4: Data Matching 4

Following these mapping 'rules' that have been created, there are also a small number of exceptions where author discretion and common sense were used to correspond ISIC classes to ANZSIC classes. Appendix 1 details the full correspondence between the two datasets and classifications. It also notes the 88 industries which are used in the analysis.

4 Empirical Model

Ultimately this section depicts the assessment of trade exposure on employment growth of differing quality jobs in the manufacturing industry in Australia between 2008 and 2013. It also allows for the presence of job polarisation to be investigated. The model that we use in our analysis is as follows:

$$ln\ Share_{it} = \alpha_i + \beta_1 Qual_{it} + \beta_2 Qual_{it}^2 + \theta_1 Trade_{it} + \theta_2 Qual_{it} Trade_{it} + \gamma_1 Indcontrols_{it} + \gamma_2 Macrocontrols_{it} + \epsilon_{it}$$

Overall there are six time periods and 88 industries, constituting 528 observations. $Share_{it}$ here represents the share of employment that manufacturing industry i has of the entire manufacturing sector, at time t. $Qual$ is the quality of employment within manufacturing industry i and is measured by wage. $Trade$ is the the exposure of industry i to imports. α_i is the unobserved heterogeneity. All these variables, as well as the controls included, will be discussed in greater detail shortly.

This model is very similar to that used by Lake and Millimet (2016). The benefit of using such a specification is that it incorporates the influence of both job quality and trade exposure on the share of a specific industry within the manufacturing sector. The cross-sectional version of this model proposed by Lake and Millimet (2016) is effectively an amalgamation of models from two previous papers. Firstly the linear and quadratic quality variables originate from the paper written by Goos and Manning (2007). They seek to identify job polarisation and ultimately do so by finding the linear term is negative while the quadratic term is positive. This implies a U-shaped relationship between growth in employment and the quality level of a job (which they also measure using wage). This indicates an increase in the share of low wage jobs and high wage jobs. The second paper that provides a precedent regarding the trade aspect of the model is that written by Autor et al. (2013). The variable that they include is a measurement of import exposure per worker, as well as using controls, while their dependent variable is the share of the labour force employed in manufacturing. Thus the model of Lake and Millimet (2016), which is

followed closely in this thesis, is effectively a combination of two previous models. One of these previous papers focuses on job polarisation and the other investigates the influence of import exposure on employment share. We want to do both. It should be noted that all three of these models discussed are cross-sectional. Hence we build upon this by incorporating a panel dimension.

Initially, and somewhat naively, we estimate the model using pooled OLS. This is essentially trivial as it is unrealistic to assume that error terms from different years are uncorrelated. As a result pooled OLS produces inefficient estimators. Moving forward we choose the methodology of estimating by fixed effects instead of random effects. Firstly fixed effects reduces the threat of omitted variable bias that pooled OLS does not address. Secondly, using fixed effects over random effects is largely commonplace in empirical panel data analysis and is the option chosen by Kambayashi and Kato (2016). As mentioned in the literature review, they focus on the influence of trade on the composition of the labour force and their use of panel data is contrary to much of the relevant literature. The popularity of using the fixed effects approach over random effects stems from the fact that it is less restrictive. In explanation, the random effects model assumes that individual specific effects, α_i, are uncorrelated with the independent variables. Consequently this assumption is likely to be violated so, consistent with the literature, we opt to use the fixed effects model. Additionally using a fixed effects estimation is preferred to using first differences as when a time period is greater than two, the coefficients are more efficient.

To address the presence of heteroskedasticity and autocorrelation in the model, which will be further discussed in the results section, we use robust standard errors. In much of the literature, including the papers by Keller and Utar (2016) as well as Lake and Millimet (2016), the approach to addressing these shortcomings is to use clustered standard errors. Clustered standard errors are robust to heteroskedasticity and autocorrelation. However their limitation is that they do not consider cross-sectional correlation. As a consequence the assumption that the errors of a panel model are correlated within observations but not between observations can often be an inappropriate constraint (Hoechle 2007). This is particularly relevant to this thesis as the observations are all industries within the manufacturing sector. Most previous literature has a broader scope of the entire labour force

and perhaps have stronger grounds for clustering standard errors. Nevertheless it would be naive to assume there is no relationship across manufacturing industries.

The approach we use is to employ Driscoll-Kraay standard errors. Whilst typically most suitable for panels with a relatively large number of time periods, T, there are no feasibility issues if the number of panels, N, exceeds the time periods. Driscoll-Kraay standard errors are robust to heteroskedasticity and autocorrelation as well as permitting cross-sectional dependence. This means that they allow for correlation between panels (Hoechle 2007). Thus it is reasonable to use them in our analysis. These will be the standard errors presented in the results section. A shortcoming of using Drsicoll-Kraay standard errors in Stata is that is does not allow a test as to whether variables are endogenous but this will be addressed later.

5 Variables

5.1 Dependent Variable

5.1.1 $ln\ Share_{it}$

The dependent variable that is used in the model is the log of employment share of specific manufacturing industry i out of the whole manufacturing industry. Consequently this will be a number between zero and one, and since there are 88 industries, this will be a number much closer to zero. By using a log dependent variable, it allows for the effect of changes in independent variables on the share of manufacturing industry i to be interpreted in percentage terms. This is a strategy employed by Goos and Manning (2007). These employment estimates relate to the number of workers employed within the industry at the end of the recorded year, regardless of the nature of their employment (full-time, part-time or casual). The below table displays the summary statistics of this variable when it is not logged, in order to help with interpretation.

Employment share of industries Inter-Quartile Range					
Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
2008	0.0002213	0.002457	0.0042888	0.0091759	0.0444356
2009	0.000244	0.0027192	0.0043082	0.0095901	0.0473809
2010	0.0002516	0.0025219	0.0041136	0.0092459	0.0480309
2011	0.0002542	0.0024177	0.003871	0.0096109	0.0477697
2012	0.0002366	0.0023597	0.0044627	0.0102816	0.049833
2013	0.0002298	0.002471	0.0043612	0.0098987	0.0494117
2008-2013	0.0002213	0.0024777	0.0042969	0.0096678	0.049833

Table 5: Employment Share Summary Statistics 2008-2013

It is interesting to note that the manufacturing industry with the least employment out of the whole sector is that of $Wool\ Scouring\ Manufacturing$. It has the lowest employment in the sector in each of the six years analysed, of around 0.02% each year. The industry with the greatest share of employment within the manufacturing sector for four of the six years is $Bakery\ Product\ Manufacturing$ while for the other two years $Printing\ Manufacturing$ occupies the greatest share of any industry within the sector. There is no dominant industry which possesses more than five per cent of the manufacturing labour force at any period between 2008 and 2013.

5.2 Independent Variables

5.2.1 $Quality_{it}$

The measure for the quality of a job within a specific industry is the average wage for the industry, measured in Australian dollars. This data is extracted from the ABS manufacturing labour data source and is calculated by dividing the total annual expenses paid towards wages and salaries in each industry by the total number of people employed within the industry at the end of the year. Using wage as an indicator for job quality, or in this case quality of employment within an industry, is commonplace in the literature. Goos and Manning (2007) adopt this method for their model. Keller and Utar (2016) do the same thing. Coelli and Borland (2015) choose to measure the quality of a job by using the skill levels attributed to each occupation. Alternatively Lake and Millimet (2016) opt to measure job quality by using the Nam-Powers-Boyd (NPB) index which is a function of the median wage and median education level of a job. The NPB index ranges from zero to one, and is the approximate percentage of the labour force who are employed in jobs with a lower wage and education combination (Lake and Millimet 2016). Due to existing literature, and data limitations, mean wage has been chosen to be the sole indicator of the quality of employment within a specific industry. Additionally, for ease of interpretation of variables within the model, this paper will follow a similar approach to Lake and Millimet in that wage has been normalised to be a number between zero and one.

Annual Wage Inter-Quartile Range ($)					
Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
2008	26,950.43	46,302.25	55,044.7	63,245.82	115,604.4
2009	22,264.2	48,406.41	54,810.01	66,531.78	102,148.8
2010	18,867.09	49,047.41	60,197.9	73,430.12	120,611.6
2011	23,017.27	50,587.53	63,576.35	74,842.62	127,116.8
2012	22,825.02	52,382.03	65,453.05	78,341.02	121,797.6
2013	22,540.46	54,736.07	65,814.73	79,382.8	141,798.1
2008-2013	18,867.09	49,598.34	60,848.14	74,422.65	141,798.1

Table 6: Annual Wage Summary Statistics 2008-2013

The above table displays the summary statistics of the non-normalised wages by industries between 2008 and 2013. Appendix 2 shows a visual representation of these wages,

in box-plot form, over the six year time period. For each of the six years *Bakery Product Manufacturing* is the industry where workers were paid the least and the highest paid industry is *Alumina Production Manufacturing*. There is a large discrepancy between the lowest and highest paid industries, which is increasing over time but could potentially be partially explained by specific industry variables. Such variables not captured could include the type of employment common to the industry, being that of casual employment, part-time or full-time.

The squared term is included as non-linearity is anticipated between *Quality* and share of employment. Also it assists in the identification of job polarisation. Goos and Manning (2007) employ the same technique. As the literature details, job polarisation resembles a U-shaped pattern. If it is found that the linear quality variable is negative and the quadratic quality term is positive, a U-shaped relationship between wages and employment share is implied. This means that there is an increase in employment share in both tails of the wage distribution but a necessary decrease in the middle.

5.2.2 $Trade_{it}$

This variable is measured by the value of imports into Australia annually and is an indication of exposure of an industry to trade. It also follows the literature of Lake and Millimet (2016) and Autor et al (2013) in the sense that it is not a logged variable. It is in current US dollar terms. Using imports as an indicator for trade exposure is commonplace in the literature. Lake and Millimet (2016) are an example of this as they choose to use Chinese import penetration for their measure of trade exposure. Keller and Utar do the exact same. So do Autor, Dorn and Hanson (2013). Their papers have slightly different intentions and have a focus on trade with China. As such the broader scope of this analysis ensures that trade exposure will be measured through aggregate imports into Australia. Alternatively, the data also allows for additional separate analysis using imports from industrialised countries as well as imports from developing countries as trade exposure measures.

Appendix 3 contains the 5-point summary of Australian imports sourced from developing countries, from industrialised countries and from the entire world. It is evident that Australia receives much more imports from industrialised countries than from developing countries. For imports from developing countries the industries which import the least include *Sugar Manufacturing* and *Printing Support Services Manufacturing*. The industries among those who import the most include *Aluminium Rolling, Drawing, and Extruding Manufacturing* as well as *Motor Vehicle Manufacturing*. Similarly for imports from industrialised countries, *Sugar Manufacturing* and *Printing Support Services Manufacturing* are also the industries which import the least. Likewise *Motor Vehicle Manufacturing* is among those that imports the most, together with *Industrial Gas Manufacturing*.

5.2.3 $Quality^{*}Trade_{it}$

This interaction term is used in the model as it is expected that trade exposure and job quality are related in their explanation of employment share within an industry. In further explanation it is likely that the quality of a job within a specific industry has differing effects on the industry's employment share when exposed to differing levels of imports. Lake and Millimet (2016) adopt this same approach. This term also aids in the interpretation of the results, which will be discussed shortly.

5.3 Controls

5.3.1 *Industry Value Added*

The Industry Value Added (IVA) in each industry is controlled for by including this variable. IVA is a measure of GDP of each industry. To take into account the different sizes of these industries, these values are divided by the total amount of workers employed in the industry. Thus it is essentially a measure of GDP per capita. Ultimately this variable is controlling for productivity of industries. Lake and Millimet (2016) adopt a similar approach when they use total factor productivity as a control for their model.

5.3.2 *Australian Tariff Rate*

This is one of three macroeconomic controls that are included in the model specification. It is expected that the $Trade$ variable is related to these controls and as such they appear in the regression. Specifically this is the Australian weighted mean tariff rate for all products.

5.3.3 *World Tariff Rate*

Similarly to the Australian tariff rate, we also include the world tariff rate. Again this is the world weighted mean tariff rate for all products. Lake and Millimet (2016) too include home and foreign tariff rates in their model.

5.3.4 *Trade Weighted Index*

Finally the trade weighted index (TWI) is also put in the model. The TWI is essentially the average of the exchange rates of the currency of a country, with weighting placed on all trading partners to reflect their significance to the country's trade. This is not a standard approach in the literature to include such a variable but it is likely nevertheless to be related to $Trade$ and consequently the dependent variable.

Interpretation of the model and its trade parameters is as follows. Recall that industry wage is normalised to be a number between zero and one. This means that the low-wage industries have wages close to zero and the high-wage industries have wages close to one. θ_1 therefore represents the effect of a one unit increase ($1,000,000) in the value of imports when *Quality* is equal to zero. Thus it indicates how changes in imports affect employment share of bad jobs. On the other hand $\theta_1 + \theta_2$ represents the effect of a one unit increase in imports when wage is equal to one. Therefore $\theta_1 + \theta_2$ measures how imports affect the employment share of good jobs.

5.4 Instrumental Variables

To address potential endogeneity we identify suitable instrumental variables. The variable that we will instrument for is $Trade$, or in particular, Australian imports. Lake and Millimet (2016) instrument for trade exposure, in which they measure by imports from China, using industry level Chinese exports to eight other high income countries. These countries are Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain and Switzerland. Autor et al. (2013) use the exact same approach when instrumenting for growth in Chinese exports to the United States. The instrumental variables are identical. Keller and Utar (2016) also instrument for imports from China using Chinese exports to eight other high income countries. However, they substitute Denmark and Spain for the Netherlands and US. It should be noted that these three papers measure trade exposure using imports from China. As we are focusing on imports from the entire world, the IVs that we will employ are total imports into eight other high income countries. These countries will follow the previous literature and be the same as the ones set out initially by Autor et al. (2013) and then later adopted by Lake and Millimet (2016). The one alteration will be to replace Australia with the US. Past empirical evidence has proven such instruments to be relevant. However endogeneity is not always found to exist and as such, IVs are not always required (Lake and Millimet 2016). Nevertheless we will conduct our own testing.

6 Results

6.1 Pooled OLS

Table 7 presents the baseline results from naively conducting Pooled OLS. In this particular finding here *Trade* represents imports into Australia from all countries. Column 1 regresses *Share* on *Quality* and *Quality Squared*. Here it is confirmed that there is job polarisation at the manufacturing industry level in Australia. This is evident in Column 1 where the linear quality term is negative while the quadratic is positive. This illustrates the U-shaped relationship previously discussed where there is an increase in the share of both good and bad jobs. Also of importance is that both these values are significant at the one per cent level. It is reminded that the standard errors are robust and of the Driscoll-Kraay type previously discussed. We do this in response to testing for heteroskedasticity and autocorrelation in Stata and finding their presence. The industry controls in the below table comprise solely of the Industry Value Added per person. The macroeconomic controls are the Australian tariff rate, the world tariff rate, and the trade weighted index.

Trade with all countries				
Variable	1	2	3	4
Quality	-0.942***	-1.147***	-1.075***	-1.075***
	(0.086)	(0.057)	(0.077)	(0.079)
Quality Squared	0.820***	1.112***	1.29***	1.30***
	(0.101)	(0.068)	(0.115)	(0.115)
Trade		0.032***	0.032***	0.032***
		(0.006)	(0.006)	(0.006)
*Quality*Trade*		-0.045***	-0.043***	-0.044***
		(0.011)	(0.010)	(0.010)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 7: Pooled OLS - Imports from all Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

Column 2 displays the results from when the two trade variables are introduced into the regression. Here $Trade$ is deemed significant at the one per cent level and the interaction is also significant at this same level. In fact all variables in all estimations are significant at the one per cent level. The results tell us that an increase in Australian imports increases the share of bad jobs, θ_1, but decreases the share of good jobs. This is evidenced by the positive coefficient on θ_1 and the negative coefficient on θ_2. Hence trade here seems to have an adverse influence on the manufacturing labour market; as there is an evident move down the wage distribution. The remaining columns introduce the controls into the model and do not drastically change the coefficients, standard errors or significance levels. This suggests that endogeneity may not be cause for concern, nevertheless we will formally test this next (Lake and Millimet 2016). Appendix 4 and Appendix 5 display the Pooled OLS results when the trade exposure is imports from developing countries and when imports are from industrialised countries. It can be deduced by looking at those tables that trade with industrialised countries produces more significant results. Importantly it is unrealistic to assume the error terms from different periods are uncorrelated when using pooled OLS. Thus it is likely to produce inefficient estimators. Furthermore there is a potential endogeneity problem that has been previously mentioned. As such we move on to conducting an IV fixed effects regression.

6.2 IV Fixed Effects

We next turn our attention to the instrumental variable analysis. As previously mentioned we address potential endogeneity of Australian imports using the imports of eight other high income countries. The results of the analysis can be seen below.

Trade with all the World				
Variable	Non-Robust SEs	Heteroskedastic-Robust SEs	Clustered SEs	Driscoll-Kraay SEs
Quality	-0.114	-0.114	-0.114	-0.114
	(0.112)	(0.159)	(0.170)	(0.167)
Quality Squared	0.047	0.047	0.047	0.047
	(0.112)	(0.146)	(0.148)	(0.158)
Trade	0.006	0.006	0.006	0.006***
	(0.005)	(0.005)	(0.006)	(0.002)
*Quality*Trade*	-0.015**	-0.015**	-0.015***	-0.015***
	(0.006)	(0.007)	(0.005)	(0.003)
Macroeconomic Controls	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes
Weak Identification Test	Strong IVs at all levels	Strong IVs at all levels	Strong IVs at all levels	Strong IVs at all levels
Sargan Statistic	P=0.33	P=0.36	P=0.52	N/A
Endogeneity Test	P=0.26	P=0.26	P=0.24	N/A

Table 8: IV Fixed Effects - Imports from all Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

Here we display the results of the IV fixed effects estimation using different standard errors. The purpose of showing the results achieved using alternative standard error measures is to show that the Driscoll-Kraay standard errors are not too dissimilar. This is necessary to do because a limitation of using Driscoll-Kraay standard errors is that Stata does not allow for an endogeneity test when using them. But since the standard error values are similar to the other forms of standard errors, which all support the hypothesis of $Trade$ being exogenous (as p>0.05 in endogeneity tests), it is reasonable to conclude that $Trade$ is exogenous even when using Driscoll-Kraay standard errors. It should be noted exogeneity of the variable $Trade$ is confirmed even when disaggregating trade to be imports from developed and industrialised countries. These results are shown in Appendices 6 and 7 respectively. It should also be noted that using the Driscoll-Kraay standard

errors does alter the standard error value for $Trade$ relatively substantially and makes it statistically significant. Nevertheless the other standard errors remain quite stable so we will assume $Trade$ is exogenous and conduct a regular fixed effects estimation. If the results are similar this will provide further evidence for exogeneity.

Lake and Millimet (2016) produce a similar finding when they conclude that their instrumental variables, which as mentioned previously are almost identical to those used in this thesis, are not required due to a lack of endogeneity. They consequently revert to OLS for the remainder of their estimations. However as we are using panel data, pooled OLS is likely to be inefficient. This is why we revert to a standard fixed effects approach.

In terms of the other results presented in the table the Sargan statistic supports the null hypothesis that the overidentifying restrictions are valid. Also the Stock and Yogo weak identification test returns a Cragg-Donald Wald F-statistic that exceeds all the critical values. This indicates that the instruments are strong. Not shown in the table but a result nonetheless, is that the instruments are not underidentified. This means that the instruments are correlated with the $Trade$ variable. It should be noted that these results were made attainable by using the user-written Stata command $xtivreg2$ (Schaffer 2010).

6.3 Fixed Effects

We will now revert to a non-IV fixed effects estimation. We continue to use Driscoll-Kraay standard errors to correct for the groupwise heteroskedasticity and autocorrelation that is again identified, but also allow for errors across industries to be correlated. Below displays the results.

Trade with all the World				
Variable	1	2	3	4
Quality	-0.137	-0.135	-0.141	-0.176
	(0.12)	(0.108)	(0.095)	(0.13)
Quality Squared	-0.013	0.041	0.064	0.088
	(0.117)	(0.103)	(0.102)	(0.120)
Trade		0.006***	0.007***	0.008***
		(0.002)	(0.002)	(0.001)
*Quality*Trade*		-0.012***	-0.012***	-0.012***
		(0.002)	(0.001)	(0.002)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 9: Fixed Effects - Imports from all Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

Our first important observation is that the results presented in Column 4 are not too dissimilar to the IV estimation using Driscoll-Kraay errors, in terms of both coefficients and standard errors. This suggests a lack of endogeneity within the model and that a regular fixed effects estimation is sufficient. This now allows us to interpret the findings in this table.

In contrast to our Pooled OLS estimation, Column 1 finds that polarisation of the labour force in the manufacturing sector is not an occurrence between 2008 and 2013. In fact the *Quality Squared* variable has even reversed its sign so there is no longer a U-shaped relationship between *Quality* and *Quality Squared*. However both variables are insignificant so we conclude that there is no evidence to support job polarisation within the manufacturing industry over the six year period.

The next result of interest are the findings presented in Column 4. Here the positive sign of *Quality Squared* returns to again imply a U-shaped relationship between the quality variables. However they still remain statistically insignificant. The variables that do display statistical significance, of which they do at the 1% level, are $Trade$ and $Quality^{*}Trade$. This consequently illustrates that despite there being no evidence of job polarisation in manufacturing in Australia over the six year time frame, there is evidence to suggest that the level of imports in an industry influences its employment share. Recalling from earlier that average wages in each industry have been normalised to a number between zero and one, the positive significant value of $Trade$ suggests that as the amount of imports increases, the share of employment within low-wage industries also increases. Or less formally, trade increases the share of bad jobs. The negative coefficient on $Quality^{*}Trade$ however indicates that imports reduce the share of people employed in high-wage industries. Thus trade decreases the share of good jobs. Ultimately this result indicates that, when considering trade with all countries, increasing imports in the manufacturing sector leads to a movement of labour down the wage distribution. However this result is not an overall trend within the sector. It only describes the influence of trade on employment share. For this to have been a trend throughout the entire industry, *Quality* and *Quality Squared* would have been required show significance and different signs. So there are other factors that appear to influence the distribution of the labour force other than trade. This is relatively intuitive.

Appendices 8 and 9 illustrate the same process but disaggregating the origin of trade to be from developing and industrialised countries. The results of the regression when using imports from industrialised countries for the $Trade$ variable is similar to the results displayed in Table 9. Here we are focusing our attention on Column 4. The more interesting finding is in Appendix 8 when trade represents imports from developing countries, also in Column 4. While $Trade$ and $Quality^{*}Trade$ remain significant, at the 1% and 10% levels respectively, *Quality* is also found to be statistically significant. It should be noted that coefficient signs do not change across the three regressions. This effectively says that when imports with developing countries are introduced into the model, there is a negative relationship between the quality, or more specifically wage, of an industry and the employment share of the industry. But there remains to be no statistically significant

U-shaped relationship between *Quality* and *Quality Squared*. Instead industries are decreasing in their employment share as their average wage increases.

A summation of the findings is as follows. After estimating the model using the appropriate fixed effects estimation, it is found that there is no polarisation of the manufacturing labour force in Australia between 2008 and 2013. Furthermore there is no significant movement of labour up or down the wage distribution at all. The exception is when we estimate the model using imports from developing countries as the $Trade$ determinant. What we do find however is that trade is an influential factor in the employment share of an industry. Specifically our results indicate that an increase in imports into Australia increases the share of employment in low-waged industries, or 'bad jobs'. Conversely an increase in imports into Australia reduces the share of employment in high-wage industries, or 'good jobs'. So while there has largely been no evident labour movement trend over this six year period, trade increases have led to a movement of employment down the wage distribution.

7 Discussion

As initially mentioned at the start of this thesis manufacturing has traditionally played an important role in the explanation of job polarisation (Keller and Utar 2016). However we attempted to investigate whether the phenomenon existed within the industry, which is one of the most heavily traded sectors. Despite our pooled OLS results initially confirming the existence of job polarisation, our further robust fixed effects analysis ruled this out. Therefore we conclude that while the role of the manufacturing industry may be significant in the existence of job polarisation on a larger labour force scale, its existence within the manufacturing industry is not supported by our results.

A significant finding of our analysis is the influence that trade has on the employment share of an industry. As mentioned in the previous section, increases in imports, regardless of their origin, increase the share of employment in bad jobs but decrease the share of employment in good jobs. Thus trade causes a movement down the wage distribution in the manufacturing sector. Such a finding has the potential to have implications for policy makers as it is possible domestic workers will be averse to the notion of increased trade openness knowing that it could lead to an overall shift of employment down the wage distribution. For example there may be worker backlash to new free trade agreements or further tariff reductions.

It is important to reiterate that manufacturing is a unique industry in Australia, and in many other high income countries throughout the world at the moment, in that not only is employment share of the industry decreasing but also it is declining in nominal employment numbers (Australian Bureau of Statistics 2015). Thus we do not intend to generalise and suggest that increased trade exposure is likely to lead to a movement of the entire labour force down the wage distribution. We also do not suggest that workers in other industries are susceptible to move down this wage distribution within their particular industry. Manufacturing is clearly not a representative industry in Australia. But something we can conclude is that increasing imports has had an adverse affect on labour in the manufacturing sector in Australia between 2008 and 2013. Bear in mind

that labour in the manufacturing sector has not been adversely affected overall in this time period however.

In terms of explaining why trade has this influence on employment share of industries of different qualities, much of the literature is relatively irrelevant as it attempts to explain job polarisation. However we have already found this not to be the circumstance. Kalleberg and Hewison (2013) find that globalisation has the potential to increase the number of bad jobs relatively. They argue that cost reductions are a cause and that these often come in the form of wage reductions. For example, if a multinational company enters into a new country, they are likely to employ workers at low wages. Therefore the share of low-waged jobs increase. However they have a large focus on developing countries and their explanations are largely not applicable to this scenario. Nevertheless it is possible to comprehend how increased import competition could increase the share of bad jobs. For instance Keller and Utar's (2016) hypothesis that an increase in productivity within the traded goods sector abroad will increase foreign competitiveness and exports, which then increases import competition, may still be applicable. But perhaps in the manufacturing sector this increase in import competition has been concentrated in the middle and high-wage industries. This could then cause a redistribution of workers into lower-waged industries. It should be said that this is merely speculation and one possible explanation for the occurrence. Further research is required in order to make a more informed hypothesis. Our results are not consistent with the routinisation hypothesis either. However this is somewhat expected as, firstly, our thesis differs in focus to much of the literature, and secondly it is likely that job descriptions between manufacturing industries entail similar levels of routine tasks.

This thesis can be extended in the future by analysing the entire labour market in Australia and researching how trade influences its movement, providing the data is available. While focusing on the manufacturing industry has proved insightful, especially by employing a panel data model, there remains room for further analysis. This is especially the case if we are attempting to identify if there has been recent job polarisation in Australia, which is initially found by Coelli and Borland (2015) in the 1990s.

8 References

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9 Appendices

9.1 Appendix 1

9.1.1 Data Mapping

As described earlier in Section 3.1 it was required to map the ISIC manufacturing industries to the ANZSIC manufacturing industries. Consequently the full correspondence follows in a comprehensive table, starting on the next page. The industries with a line through them were not used in the analysis due to data availability issues or difficulty in the matching of the data.

Table 10: ANZSIC - ISIC Correspondence Table.

ANZSIC	ISIC
1111 Meat Processing	1010p Processing and preserving of meat
	1075p Manufacture of prepared meals and dishes
1112 Poultry Processing	1010p Processing and preserving of meat
	1075p Manufacture of prepared meals and dishes
1113 Cured Meat and Smallgoods Manufacturing	1010p Processing and preserving of meat
	1075p Manufacture of prepared meals and dishes
1120 Seafood Processing	0311p Marine fishing
	1020p Processing and preserving of fish, crustaceans and molluscs
	1075p Manufacture of prepared meals and dishes
1131 Milk and Cream Processing	1050p Manufacture of dairy products
1132 Ice Cream Manufacturing	1050p Manufacture of dairy products
1133 Cheese and Other Dairy Product Manufacturing	1050p Manufacture of dairy products
	1079p Manufacture of other food products n.e.c.
1140 Fruit and Vegetable Processing	1030p Processing and preserving of fruit and vegetables
	1075p Manufacture of prepared meals and dishes
	1079p Manufacture of other food products n.e.c.
~~1150 Oil and Fat Manufacturing~~	1040 Manufacture of vegetable and animal oils and fats
	1062p Manufacture of starches and starch products
	1073p Manufacture of cocoa, chocolate and sugar confectionery
1161 Grain Mill Product Manufacturing	1061p Manufacture of grain mill products
	1062p Manufacture of starches and starch products
	1075p Manufacture of prepared meals and dishes
	1079p Manufacture of other food products n.e.c.
	1103p Manufacture of malt liquors and malt
1162 Cereal, Pasta and Baking Mix Manufacturing	1061p Manufacture of grain mill products
	1074 Manufacture of macaroni, noodles, couscous and similar farinaceous products
1171 Bread Manufacturing (Factory based)	1061p Manufacture of grain mill products
	1071p Manufacture of bakery products
1172 Cake and Pastry Manufacturing (Factory based)	1071p Manufacture of bakery products
1173 Biscuit Manufacturing (Factory based)	1071p Manufacture of bakery products
1174 Bakery Product Manufacturing (Non-factory based)	1071p Manufacture of bakery products
1181 Sugar Manufacturing	1072 Manufacture of sugar

ANZSIC	ISIC
1182 Confectionery Manufacturing	1073p Manufacture of cocoa, chocolate and sugar confectionery
~~1191 Potato, Corn and Other Crisp Manufacturing~~	1030p Processing and preserving of fruit and vegetables
	1071p Manufacture of bakery products
	1079p Manufacture of other food products n.e.c.
~~1192 Prepared Animal and Bird Feed Manufacturing~~	1080 Manufacture of prepared animal feeds
~~1199 Other Food Product Manufacturing n.e.c.~~	1030p Processing and preserving of fruit and vegetables
	1071p Manufacture of bakery products
	1075p Manufacture of prepared meals and dishes
	1079p Manufacture of other food products n.e.c.
~~1211 Soft Drink, Cordial and Syrup Manufacturing~~	1030p Processing and preserving of fruit and vegetables
	1079p Manufacture of other food products n.e.c.
	1102p Manufacture of wines
	1104 Manufacture of soft drinks; production of mineral waters and other bottled water
1212 Beer Manufacturing	1103p Manufacture of malt liquors and malt
~~1213 Spirit Manufacturing~~	1101 Distilling, rectifying and blending of spirits
1214 Wine and Other Alcoholic Beverage Manufacturing	1079p Manufacture of other food products n.e.c.
	1102p Manufacture of wines
~~1220 Cigarette and Tobacco Product Manufacturing~~	1200 Manufacture of tobacco products
1311 Wool Scouring	1311p Preparation and spinning of textile fibres
	2023p Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
1312 Natural Textile Manufacturing	1311p Preparation and spinning of textile fibres
	1312p Weaving of textiles
1313 Synthetic Textile Manufacturing	1311p Preparation and spinning of textile fibres
	1312p Weaving of textiles
	1399p Manufacture of other textiles n.e.c.
~~1320 Leather Tanning, Fur Dressing and Leather Product Manufacturing~~	1420p Manufacture of articles of fur
	1511 Tanning and dressing of leather; dressing and dyeing of fur
	1512p Manufacture of luggage, handbags and the like, saddlery and harness
	3092p Manufacture of bicycles and invalid carriages
	3290p Other manufacturing n.e.c.
1331 Textile Floor Covering Manufacturing	1393 Manufacture of carpets and rugs

ANZSIC	ISIC
1332 Rope, Cordage and Twine Manufacturing	1394 Manufacture of cordage, rope, twine and netting
1333 Cut and Sewn Textile Product Manufacturing	1392p Manufacture of made-up textile articles, except apparel
	1399p Manufacture of other textiles n.e.c.
~~1334 Textile Finishing and Other Textile Product Manufacturing~~	1313p Finishing of textiles
	1392p Manufacture of made-up textile articles, except apparel
	1399p Manufacture of other textiles n.e.c.
	1709p Manufacture of other articles of paper and paperboard
	2100p Manufacture of pharmaceuticals, medicinal chemical and botanical products
~~1340 Knitted Product Manufacturing~~	1391 Manufacture of knitted and crocheted fabrics
	1392p Manufacture of made-up textile articles, except apparel
	1410p Manufacture of wearing apparel, except fur apparel
	1430 Manufacture of knitted and crocheted apparel
~~1351 Clothing Manufacturing~~	1399p Manufacture of other textiles n.e.c.
	1410p Manufacture of wearing apparel, except fur apparel
	1420p Manufacture of articles of fur
	2219p Manufacture of other rubber products
	2220p Manufacture of plastics products
	3230p Manufacture of sports goods
	3290p Other manufacturing n.e.c.
~~1352 Footwear Manufacturing~~	1520p Manufacture of footwear
	1629p Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
	2219p Manufacture of other rubber products
	2220p Manufacture of plastics products
	3230p Manufacture of sports goods
~~1411 Log Sawmilling~~	1610p Sawmilling and planing of wood
~~1412 Wood Chipping~~	1610p Sawmilling and planing of wood
1413 Timber Resawing and Dressing	1610p Sawmilling and planing of wood
	1622p Manufacture of builders' carpentry and joinery
1491 Prefabricated Wooden Building Manufacturing	1622p Manufacture of builders' carpentry and joinery
1492 Wooden Structural Fitting and Component Manufacturing	1622p Manufacture of builders' carpentry and joinery
	4330p Building completion and finishing

ANZSIC	ISIC
1493 Veneer and Plywood Manufacturing	1621p Manufacture of veneer sheets and wood-based panels
1494 Reconstituted Wood Product Manufacturing	1621p Manufacture of veneer sheets and wood-based panels
1499 Other Wood Product Manufacturing n.e.c.	1623 Manufacture of wooden containers
	1629p Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
	3290p Other manufacturing n.e.c.
1510 Pulp, Paper and Paperboard Manufacturing	1701p Manufacture of pulp, paper and paperboard
1521 Corrugated Paperboard and Paperboard Container Manufacturing	1702p Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
1522 Paper Bag Manufacturing	1702p Manufacture of corrugated paper and paperboard and of containers of paper and paperboard
1523 Paper Stationery Manufacturing	1709p Manufacture of other articles of paper and paperboard
	3240p Manufacture of games and toys
1524 Sanitary Paper Product Manufacturing	1709p Manufacture of other articles of paper and paperboard
	3250p Manufacture of medical and dental instruments and supplies
~~1529 Other Converted Paper Product Manufacturing~~	1709p Manufacture of other articles of paper and paperboard
1611 Printing	1313p Finishing of textiles
	1811 Printing
1612 Printing Support Services	1812 Service activities related to printing
~~1620 Reproduction of Recorded Media~~	1820 Reproduction of recorded media
~~1701 Petroleum Refining and Petroleum Fuel Manufacturing~~	1920p Manufacture of refined petroleum products
~~1709 Other Petroleum and Coal Product Manufacturing~~	1910p Manufacture of coke oven products
	1920p Manufacture of refined petroleum products
	2011p Manufacture of basic chemicals
	2029p Manufacture of other chemical products n.e.c.
	2399p Manufacture of other non-metallic mineral products n.e.c.
1811 Industrial Gas Manufacturing	1910p Manufacture of coke oven products
	1920p Manufacture of refined petroleum products
	2011p Manufacture of basic chemicals
1812 Basic Organic Chemical Manufacturing	1910p Manufacture of coke oven products
	2011p Manufacture of basic chemicals

ANZSIC	ISIC
1813 Basic Inorganic Chemical Manufacturing	2011p Manufacture of basic chemicals
	2012p Manufacture of fertilizers and nitrogen compounds
	2100p Manufacture of pharmaceuticals, medicinal chemical and botanical products
~~1821 Synthetic Resin and Synthetic Rubber Manufacturing~~	2013p Manufacture of plastics and synthetic rubber in primary forms
~~1829 Other Basic Polymer Manufacturing~~	2013p Manufacture of plastics and synthetic rubber in primary forms
	2030 Manufacture of man-made fibres
1831 Fertiliser Manufacturing	2012p Manufacture of fertilizers and nitrogen compounds
	3821p Treatment and disposal of non-hazardous waste
1832 Pesticide Manufacturing	2021 Manufacture of pesticides and other agrochemical products
1841 Human Pharmaceutical and Medicinal Product Manufacturing	2100p Manufacture of pharmaceuticals, medicinal chemical and botanical products
1842 Veterinary Pharmaceutical and Medicinal Product Manufacturing	2100p Manufacture of pharmaceuticals, medicinal chemical and botanical products
1851 Cleaning Compound Manufacturing	2023p Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
1852 Cosmetic and Toiletry Preparation Manufacturing	2023p Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
~~1891 Photographic Chemical Product Manufacturing~~	2011p Manufacture of basic chemicals
	2029p Manufacture of other chemical products n.e.c.
1892 Explosive Manufacturing	2011p Manufacture of basic chemicals
	2012p Manufacture of fertilizers and nitrogen compounds
	2029p Manufacture of other chemical products n.e.c.
~~1899 Other Basic Chemical Product Manufacturing n.e.c.~~	2011p Manufacture of basic chemicals
	2029p Manufacture of other chemical products n.e.c.
1911 Polymer Film and Sheet Packaging Material Manufacturing	2220p Manufacture of plastics products
~~1912 Rigid and Semi-Rigid Polymer Product Manufacturing~~	2220p Manufacture of plastics products
	2733p Manufacture of wiring devices
	3100p Manufacture of furniture
	3290p Other manufacturing n.e.c.

ANZSIC	ISIC
1913 Polymer Foam Product Manufacturing	2220p Manufacture of plastics products
	2733p Manufacture of wiring devices
	3290p Other manufacturing n.e.c.
	4330p Building completion and finishing
1914 Tyre Manufacturing	2211 Manufacture of rubber tyres and tubes; retreading and rebuilding of rubber tyres
1915 Adhesive Manufacturing	2029p Manufacture of other chemical products n.e.c.
1916 Paint and Coatings Manufacturing	2011p Manufacture of basic chemicals
	2022 Manufacture of paints, varnishes and similar coatings, printing ink and mastics
	2029p Manufacture of other chemical products n.e.c.
~~1919 Other Polymer Product Manufacturing~~	1410p Manufacture of wearing apparel, except fur apparel
	2219p Manufacture of other rubber products
	2220p Manufacture of plastics products
	2930p Manufacture of parts and accessories for motor vehicles
	3011p Building of ships and floating structures
	3290p Other manufacturing n.e.c.
1920 Natural Rubber Product Manufacturing	2219p Manufacture of other rubber products
2010 Glass and Glass Product Manufacturing	2310p Manufacture of glass and glass products
2021 Clay Brick Manufacturing	2392p Manufacture of clay building materials
2029 Other Ceramic Product Manufacturing	2391 Manufacture of refractory products
	2392p Manufacture of clay building materials
	2393 Manufacture of other porcelain and ceramic products
2031 Cement and Lime Manufacturing	2394p Manufacture of cement, lime and plaster
2032 Plaster Product Manufacturing	2394p Manufacture of cement, lime and plaster
	2395p Manufacture of articles of concrete, cement and plaster
2033 Ready-Mixed Concrete Manufacturing	2395p Manufacture of articles of concrete, cement and plaster
2034 Concrete Product Manufacturing	2395p Manufacture of articles of concrete, cement and plaster
~~2090 Other Non-Metallic Mineral Product Manufacturing~~	1709p Manufacture of other articles of paper and paperboard
	2310p Manufacture of glass and glass products
	2395p Manufacture of articles of concrete, cement and plaster
	2396 Cutting, shaping and finishing of stone
	2399p Manufacture of other non-metallic mineral products n.e.c.

ANZSIC	ISIC
	3290p Other manufacturing n.e.c.
2110 Iron Smelting and Steel Manufacturing	2410p Manufacture of basic iron and steel
	2599p Manufacture of other fabricated metal products n.e.c.
2121 Iron and Steel Casting	2410p Manufacture of basic iron and steel
	2431 Casting of iron and steel
	2599p Manufacture of other fabricated metal products n.e.c.
2122 Steel Pipe and Tube Manufacturing	2410p Manufacture of basic iron and steel
2131 Alumina Production	2420p Manufacture of basic precious and other non-ferrous metals
~~2132 Aluminium Smelting~~	2420p Manufacture of basic precious and other non-ferrous metals
2133 Copper, Silver, Lead and Zinc Smelting and Refining	2420p Manufacture of basic precious and other non-ferrous metals
~~2139 Other Basic Non-Ferrous Metal Manufacturing~~	2420p Manufacture of basic precious and other non-ferrous metals
~~2141 Non-Ferrous Metal Casting~~	2432 Casting of non-ferrous metals
2142 Aluminium Rolling, Drawing, Extruding	2420p Manufacture of basic precious and other non-ferrous metals
	2591p Forging, pressing, stamping and roll-forming of metal; powder metallurgy
	2599p Manufacture of other fabricated metal products n.e.c.
2149 Other Basic Non-Ferrous Metal Product Manufacturing	2420p Manufacture of basic precious and other non-ferrous metals
	2591p Forging, pressing, stamping and roll-forming of metal; powder metallurgy
	2599p Manufacture of other fabricated metal products n.e.c.
~~2210 Iron and Steel Forging~~	2591p Forging, pressing, stamping and roll-forming of metal; powder metallurgy
2221 Structural Steel Fabricating	2511p Manufacture of structural metal products
2222 Prefabricated Metal Building Manufacturing	2511p Manufacture of structural metal products
2223 Architectural Aluminium Product Manufacturing	2511p Manufacture of structural metal products
2224 Metal Roof and Guttering Manufacturing (except Aluminium)	2511p Manufacture of structural metal products
~~2229 Other Structural Metal Product Manufacturing~~	2511p Manufacture of structural metal products
2231 Boiler, Tank and Other Heavy Gauge Metal Container Manufacturing	2512 Manufacture of tanks, reservoirs and containers of metal
	2513p Manufacture of steam generators, except central heating hot water boilers

ANZSIC	ISIC
2239 Other Metal Container Manufacturing	2599p Manufacture of other fabricated metal products n.e.c.
2240 Sheet Metal Product Manufacturing (except Metal Structural and Container Products)	2511p Manufacture of structural metal products
	2591p Forging, pressing, stamping and roll-forming of metal; powder metallurgy
	2599p Manufacture of other fabricated metal products n.e.c.
2291 Spring and Wire Product Manufacturing	2599p Manufacture of other fabricated metal products n.e.c.
	3099p Manufacture of other transport equipment n.e.c.
2292 Nut, Bolt, Screw and Rivet Manufacturing	2599p Manufacture of other fabricated metal products n.e.c.
~~2293 Metal Coating and Finishing~~	2592 Treatment and coating of metals; machining
2299 Other Fabricated Metal Product Manufacturing n.e.c.	2511p Manufacture of structural metal products
	2520 Manufacture of weapons and ammunition
	2593p Manufacture of cutlery, hand tools and general hardware
	2599p Manufacture of other fabricated metal products n.e.c.
	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
	2812p Manufacture of fluid power equipment
	2813p Manufacture of other pumps, compressors, taps and valves
	3290p Other manufacturing n.e.c.
2311 Motor Vehicle Manufacturing	2910p Manufacture of motor vehicles
~~2312 Motor Vehicle Body and Trailer Manufacturing~~	2920 Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers
~~2313 Automotive Electrical Component Manufacturing~~	2733p Manufacture of wiring devices
	2740p Manufacture of electric lighting equipment
	2790p Manufacture of other electrical equipment
	2930p Manufacture of parts and accessories for motor vehicles
2319 Other Motor Vehicle Parts Manufacturing	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
	2910p Manufacture of motor vehicles
	2930p Manufacture of parts and accessories for motor vehicles

ANZSIC	ISIC
~~2391 Shipbuilding and Repair Services~~	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines 3011p Building of ships and floating structures 3012p Building of pleasure and sporting boats 3312p Repair of machinery 3315p Repair of transport equipment, except motor vehicles 3830p Materials recovery
~~2392 Boatbuilding and Repair Services~~	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines 3011p Building of ships and floating structures 3012p Building of pleasure and sporting boats 3312p Repair of machinery 3315p Repair of transport equipment, except motor vehicles
2393 Railway Rolling Stock Manufacturing and Repair Services	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines 3020p Manufacture of railway locomotives and rolling stock 3312p Repair of machinery 3315p Repair of transport equipment, except motor vehicles
~~2394 Aircraft Manufacturing and Repair Services~~	2651p Manufacture of measuring, testing, navigating and control equipment 2829p Manufacture of other special-purpose machinery 3030p Manufacture of air and spacecraft and related machinery 3313p Repair of electronic and optical equipment 3315p Repair of transport equipment, except motor vehicles
~~2399 Other Transport Equipment Manufacturing n.e.c.~~	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines 2816p Manufacture of lifting and handling equipment 3011p Building of ships and floating structures 3012p Building of pleasure and sporting boats 3040 Manufacture of military fighting vehicles 3091 Manufacture of motorcycles 3092p Manufacture of bicycles and invalid carriages 3099p Manufacture of other transport equipment n.e.c. 3100p Manufacture of furniture

ANZSIC	ISIC
~~2411 Photographic, Optical and Ophthalmic Equipment Manufacturing~~	3240p Manufacture of games and toys 3312p Repair of machinery 3315p Repair of transport equipment, except motor vehicles 2620p Manufacture of computers and peripheral equipment 2651p Manufacture of measuring, testing, navigating and control equipment 2670p Manufacture of optical instruments and photographic equipment 3250p Manufacture of medical and dental instruments and supplies
~~2412 Medical and Surgical Equipment Manufacturing~~	2023p Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations 2593p Manufacture of cutlery, hand tools and general hardware 2651p Manufacture of measuring, testing, navigating and control equipment 2660p Manufacture of irradiation, electromedical and electrotherapeutic equipment 2670p Manufacture of optical instruments and photographic equipment 3250p Manufacture of medical and dental instruments and supplies
~~2419 Other Professional and Scientific Equipment Manufacturing~~	3290p Other manufacturing n.e.c. 2651p Manufacture of measuring, testing, navigating and control equipment 2652 Manufacture of watches and clocks 2660p Manufacture of irradiation, electromedical and electrotherapeutic equipment 2670p Manufacture of optical instruments and photographic equipment 2731p Manufacture of fibre optic cables 2790p Manufacture of other electrical equipment 2819p Manufacture of other general-purpose machinery 3020p Manufacture of railway locomotives and rolling stock
~~2421 Computer and Electronic Office Equipment Manufacturing~~	2610p Manufacture of electronic components and boards 2620p Manufacture of computers and peripheral equipment

ANZSIC	ISIC
~~2422 Communication Equipment Manufacturing~~	2640p Manufacture of consumer electronics 2817p Manufacture of office machinery and equipment (except computers and peripheral equipment) 2610p Manufacture of electronic components and boards 2630p Manufacture of communication equipment 2651p Manufacture of measuring, testing, navigating and control equipment 2670p Manufacture of optical instruments and photographic equipment 2733p Manufacture of wiring devices 2790p Manufacture of other electrical equipment
~~2429 Other Electronic Equipment Manufacturing~~	2610p Manufacture of electronic components and boards 2630p Manufacture of communication equipment 2640p Manufacture of consumer electronics 2651p Manufacture of measuring, testing, navigating and control equipment 2670p Manufacture of optical instruments and photographic equipment 2680 Manufacture of magnetic and optical media 2750p Manufacture of domestic appliances 2790p Manufacture of other electrical equipment
~~2431 Electric Cable and Wire Manufacturing~~	2610p Manufacture of electronic components and boards 2731p Manufacture of fibre optic cables 2732 Manufacture of other electronic and electric wires and cables 2790p Manufacture of other electrical equipment
2432 Electric Lighting Equipment Manufacturing	2740p Manufacture of electric lighting equipment 2790p Manufacture of other electrical equipment
~~2439 Other Electrical Equipment Manufacturing~~	2610p Manufacture of electronic components and boards 2630p Manufacture of communication equipment 2651p Manufacture of measuring, testing, navigating and control equipment 2710 Manufacture of electric motors, generators, transformers and electricity distribution and control apparatus 2720 Manufacture of batteries and accumulators 2733p Manufacture of wiring devices

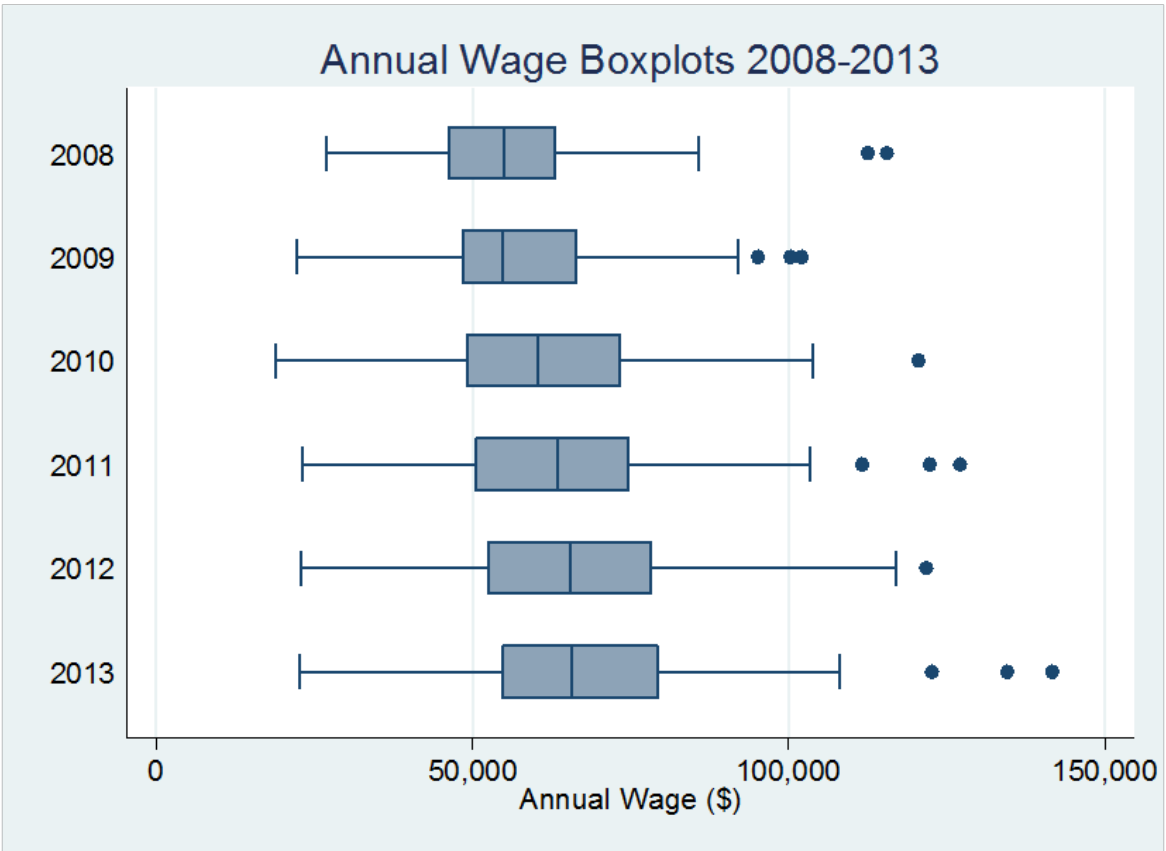
ANZSIC	ISIC
	2790p Manufacture of other electrical equipment
	2815p Manufacture of ovens, furnaces and furnace burners
2441 Whiteware Appliance Manufacturing	2750p Manufacture of domestic appliances
~~2449 Other Domestic Appliance Manufacturing~~	2651p Manufacture of measuring, testing, navigating and control equipment
	2750p Manufacture of domestic appliances
	2813p Manufacture of other pumps, compressors, taps and valves
	2815p Manufacture of ovens, furnaces and furnace burners
	2819p Manufacture of other general-purpose machinery
	2826p Manufacture of machinery for textile, apparel and leather production
2451 Pump and Compressor Manufacturing	2812p Manufacture of fluid power equipment
	2813p Manufacture of other pumps, compressors, taps and valves
~~2452 Fixed Space Heating, Cooling and Ventilation Equipment Manufacturing~~	2651p Manufacture of measuring, testing, navigating and control equipment
	2813p Manufacture of other pumps, compressors, taps and valves
	2815p Manufacture of ovens, furnaces and furnace burners
	2819p Manufacture of other general-purpose machinery
2461 Agricultural Machinery and Equipment Manufacturing	2821 Manufacture of agricultural and forestry machinery
	2825p Manufacture of machinery for food, beverage and tobacco processing
2462 Mining and Construction Machinery Manufacturing	2824 Manufacture of machinery for mining, quarrying and construction
~~2463 Machine Tool and Parts Manufacturing~~	2593p Manufacture of cutlery, hand tools and general hardware
	2818 Manufacture of power-driven hand tools
	2819p Manufacture of other general-purpose machinery
	2822p Manufacture of metal-forming machinery and machine tools
	2823 Manufacture of machinery for metallurgy
~~2469 Other Specialised Machinery and Equipment Manufacturing~~	2593p Manufacture of cutlery, hand tools and general hardware
	2660p Manufacture of irradiation, electromedical and electrotherapeutic equipment

ANZSIC	ISIC
	2790p Manufacture of other electrical equipment
	2819p Manufacture of other general-purpose machinery
	2825p Manufacture of machinery for food, beverage and tobacco processing
	2826p Manufacture of machinery for textile, apparel and leather production
	2829p Manufacture of other special-purpose machinery
2491 Lifting and Material Handling Equipment Manufacturing	2816p Manufacture of lifting and handling equipment
~~2499 Other Machinery and Equipment Manufacturing n.e.c.~~	2513p Manufacture of steam generators, except central heating hot water boilers
	2811p Manufacture of engines and turbines, except aircraft, vehicle and cycle engines
	2812p Manufacture of fluid power equipment
	2813p Manufacture of other pumps, compressors, taps and valves
	2814 Manufacture of bearings, gears, gearing and driving elements
	2815p Manufacture of ovens, furnaces and furnace burners
	2819p Manufacture of other general-purpose machinery
	2822p Manufacture of metal-forming machinery and machine tools
	2826p Manufacture of machinery for textile, apparel and leather production
	3250p Manufacture of medical and dental instruments and supplies
~~2511 Wooden Furniture and Upholstered Seat Manufacturing~~	2930p Manufacture of parts and accessories for motor vehicles
	3011p Building of ships and floating structures
	3020p Manufacture of railway locomotives and rolling stock
	3030p Manufacture of air and spacecraft and related machinery
	3100p Manufacture of furniture
~~2512 Metal Furniture Manufacturing~~	2930p Manufacture of parts and accessories for motor vehicles
	3011p Building of ships and floating structures
	3020p Manufacture of railway locomotives and rolling stock

ANZSIC	ISIC
	3030p Manufacture of air and spacecraft and related machinery
	3100p Manufacture of furniture
2513 Mattress Manufacturing	2219p Manufacture of other rubber products
	3100p Manufacture of furniture
~~2519 Other Furniture Manufacturing~~	2817p Manufacture of office machinery and equipment (except computers and peripheral equipment)
	3100p Manufacture of furniture
2591 Jewellery and Silverware Manufacturing	2599p Manufacture of other fabricated metal products n.e.c.
	3211p Manufacture of jewellery and related articles
	3212 Manufacture of imitation jewellery and related articles
~~2592 Toy, Sporting and Recreational Product Manufacturing~~	3230p Manufacture of sports goods
	3240p Manufacture of games and toys
~~2599 Other Manufacturing n.e.c.~~	1629p Manufacture of other products of wood; manufacture of articles of cork, straw and plaiting materials
	1701p Manufacture of pulp, paper and paperboard
	2219p Manufacture of other rubber products
	2220p Manufacture of plastics products
	2599p Manufacture of other fabricated metal products n.e.c.
	3220 Manufacture of musical instruments
	3240p Manufacture of games and toys
	3290p Other manufacturing n.e.c.

9.2 Appendix 2

9.2.1 Annual Wage Summary Statistics



9.3 Appendix 3

9.3.1 Trade Summary Statistics

Trade (with all countries) Inter-Quartile Range ($USm)					
Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
2008	6,745	387,364	1,039,872	3,040,452	23,456,487
2009	7,874	343,940	930,084.5	2,810,186	16,875,458
2010	16,466	392,698	1,161,039	3,100,455	25,310,506
2011	21,271	415,833.5	1,775,210	3,353,217	20,998,593
2012	17,982	402,666	1,797,308	3,833,178	25,534,056
2013	16,205	420,486.5	1,655,965	3,675,357	24,874,866
2008-2013	6,745	392,698	1,441,756	3,104,756	25,534,056

Table 11: Trade (with all countries) Summary Statistics 2008-2013

Trade (with developing countries) Inter-Quartile Range ($USm)					
Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
2008	1,007	99,979	272,969	1,015,883	5,416,546
2009	658	97,837	286,330	884,561	5,783,019
2010	3,357	138,302	373,174	1,095,616	6,789,761
2011	8,683	142,728	424,839	1,441,111	6,352,172
2012	8,596	149,655	473,600	1,590,859	7,240,832
2013	8,057	169,554	485,980	1,592,479	5,891,452
2008-2013	658	138,302	351,668	1,239,802	7,240,832

Table 12: Trade (with developing countries) Summary Statistics 2008-2013

Trade (with industrialised countries) Inter-Quartile Range ($USm)					
Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
2008	5,738	232,321	564,888	1,889,246	18,174,123
2009	7,215	215,613	487,873	1,670,969	13,194,562
2010	13,109	207,336	603,181.5	1,860,321	19,507,078
2011	12,588	204,947.5	646,552.5	1,978,261	17,245,460
2012	9,387	212,685	647,416	2,059,366	20,277,990
2013	8,148	202,864.5	648,004	1,985,620	18,983,300
2008-2013	5,738	207,336	612,531	1,890,331	20,277,990

Table 13: Trade (with industrialised countries) Summary Statistics 2008-2013

9.4 Appendix 4

9.4.1 Pooled OLS - Trade with Developing Countries

Trade with Developing Countries				
Variable	1	2	3	4
Quality	-0.942***	-0.898***	-0.871***	-0.865***
	(0.086)	(0.077)	(0.115)	(0.113)
Quality Squared	0.820***	0.720***	0.960***	0.965***
	(0.101)	(0.092)	(0.198)	(0.200)
Trade		0.025***	0.030***	0.031***
		(0.004)	(0.0025)	(0.0026)
*Quality*Trade*		-0.001	-0.015*	-0.016*
		(0.007)	(0.0084)	(0.0085)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 14: Pooled OLS - Imports from Developing Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

9.5 Appendix 5

9.5.1 Pooled OLS - Trade with Industrialised Countries

Trade with Industrialised Countries				
Variable	1	2	3	4
Quality	-0.942***	-1.19***	-1.11***	-1.11***
	(0.086)	(0.060)	(0.080)	(0.082)
Quality Squared	0.820***	1.161***	1.33***	1.34***
	(0.101)	(0.063)	(0.119)	(0.119)
Trade		0.053***	0.052***	0.052***
		(0.0085)	(0.008)	(0.008)
*Quality*Trade*		-0.077***	-0.074***	-0.074***
		(0.015)	(0.014)	(0.014)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 15: Pooled OLS - Imports from Industrialised Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

9.6 Appendix 6

9.6.1 IV analysis - Trade with Developing Countries

Trade with Developing Countries				
Variable	Non-Robust SEs	Heteroskedastic-Robust SEs	Clustered SEs	Driscoll-Kraay SEs
Quality	-0.045	-0.045	-0.045	-0.045
	(0.117)	(0.18)	(0.20)	(0.20)
Quality Squared	-0.033	-0.033	-0.033	-0.033
	(0.110)	(0.16)	(0.17)	(0.17)
Trade	0.009	0.009	0.009	0.009
	(0.018)	(0.019)	(0.020)	(0.013)
*Quality*Trade*	-0.040	-0.040	-0.040	-0.040**
	(0.024)	(0.033)	(0.037)	(0.016)
Macroeconomic Controls	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes
Weak Identification Test	Strong IVs at 10% level	Strong IVs at 10% level	Strong IVs at 10% level	Strong IVs at 10% level
Sargan Statistic	P=0.15	P=0.23	P=0.23	N/A
Endogeneity Test	P=0.24	P=0.47	P=0.33	N/A

Table 16: IV analysis - Imports from Developing Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

9.7 Appendix 7

9.7.1 IV analysis - Trade with Industrialised Countries

Trade with Industrialised Countries				
Variable	Non-Robust SEs	Heteroskedastic-Robust SEs	Clustered SEs	Driscoll-Kraay SEs
Quality	-0.131	-0.131	-0.131	-0.131
	(0.112)	(0.16)	(0.171)	(0.168)
Quality Squared	0.061	0.061	0.061	0.061
	(0.112)	(0.15)	(0.15)	(0.162)
Trade	0.009	0.009	0.009	0.009***
	(0.006)	(0.007)	(0.009)	(0.002)
*Quality*Trade*	-0.021**	-0.021**	-0.021**	-0.021***
	(0.008)	(0.009)	(0.006)	(0.003)
Macroeconomic Controls	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes
Weak Identification Test	Strong IVs at all levels	Strong IVs at all levels	Strong IVs at all levels	Strong IVs at all levels
Sargan Statistic	P=0.31	P=0.36	P=0.53	N/A
Endogeneity Test	P=0.12	P=0.16	P=0.26	N/A

Table 17: IV analysis - Imports from Industrialised Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

9.8 Appendix 8

9.8.1 Fixed Effects - Trade with Developing Countries

Trade with Developing Countries				
Variable	1	2	3	4
Quality	-0.137	-0.135	-0.196**	-0.250*
	(0.12)	(0.121)	(0.097)	(0.144)
Quality Squared	-0.013	0.002	0.056	0.087
	(0.117)	(0.111)	(0.096)	(0.120)
Trade		0.006***	0.014***	0.015***
		(0.003)	(0.004)	(0.003)
*Quality*Trade*		-0.014**	-0.022**	-0.022*
		(0.0076)	(0.0098)	(0.011)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 18: Fixed Effects - Imports from Developing Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$

9.9 Appendix 9

9.9.1 Fixed Effects - Trade with Industrialised Countries

Trade with Industrialised Countries				
Variable	1	2	3	4
Quality	-0.137	-0.139	-0.146	-0.183
	(0.12)	(0.108)	(0.097)	(0.13)
Quality Squared	-0.013	0.065	0.064	0.089
	(0.117)	(0.106)	(0.102)	(0.125)
Trade		0.008***	0.008***	0.009***
		(0.002)	(0.002)	(0.0017)
*Quality*Trade*		-0.017***	-0.015***	-0.016***
		(0.002)	(0.001)	(0.0015)
Macroeconomic Controls	No	No	No	Yes
Industry Controls	No	No	Yes	Yes

Table 19: Fixed Effects - Imports from Industrialised Countries

$^{*}p < 0.10$, $^{**}p < 0.05$ and $^{***}p < 0.01$