The impact of Foreign Direct Investment on Total Factor Productivity, a propensity score-based estimation analysis

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Contents

1 Introduction

When examining the potential outcomes of Foreign Direct Investment (FDI) into a firm, there are multiple techniques and outcomes that can be used. Using propensity-score-based estimation, we analyse the impact that FDI has on Total Factor Productivity (TFP), as we find existing literature that analyses similar variables. We find a significant positive affect of FDI on Total Factor Productivity, and this finding remains when testing for different specifications.

2 Literature Review

In this section, we analyse a variety of studies examining the relationship between FDI and firm level performance.

2.1. Does inward foreign direct investment improve the innovative performance of local firms? (García et al., 2013)

García et al., 2013 explore the links between firm innovation in Spain and inward FDI into Spain. Innovation levels were defined as Patent Applications submitted and product innovations (new or modified products introduced) over a year. They perform a negative binomial regression, with three-year lags of FDI. When examining correlations between variables, they find FDI into firms has positive correlations with both innovation variables; however, FDI into industry has mixed direct effects on innovation.

Examining the negative binomial regression, they fail to find a significant relationship between FDI into Industry and Patent Activity, and FDI into Firm and Product Innovations. However, statistically significant negative coefficients are found between FDI into firms and Patent Activity & FDI into industry and Product Innovations. This therefore suggests that foreign firms investing in Spain switch their innovative activity towards the home country of the foreign firms through crowding out of domestic innovation.

2.2 Estimating direct and indirect effects of foreign direct investment on firm productivity in the presence of interactions between firms (Girma et al., 2015)

Studying the Chinese manufacturing industry, Girma et al. (2015) examine the direct and indirect effects of FDI on firm productivity. To estimate potential outcomes of FDI, they focus on counterfactual outcomes to estimate the treatment effect. A propensity score framework controls for initial productivity by conditioning the treatment dummy variable on a pre-treatment characteristics vector, and the conditional independence assumption is applied, combined with difference-in-differences to account for firm level unobserved heterogeneity. For the estimation, the expected individual outcomes per cluster are identified by using inverse propensity-score weighted regression in 3 stages: a propensity-score of treatment is generated via logistic regression, then estimating the outcome equation with inverse probability weighted regression. Finally, cluster specific potential outcomes are computed.

They find that there is a significant effect of the amount of foreign owned firms in a cluster on productivity, which supports their hypothesis that “foreign owned firms have higher investments in productivity enhancing activities.” However, they also discover that there is a significant negative

indirect effect on domestically owned firms, suggesting negative externalities in the form of productivity spill-overs, theorised to be from market-stealing effects from multinationals. Overall, the total effect of FDI is generally positive for productivity, even with strong evidence of negative spill-overs being present.

2.3. Does heterogeneity matter to the direct effect of FDI on firm performance? (Song & Lie, 2018)

Song & Lie (2018) use a propensity-score Difference-in-Differences (PM-DID) technique to control for selection biases and endogeneity when examining direct effects of FDI through Mergers & Acquisitions on firms' profitability gains. A multinomial logit estimates the probability that a firm is acquired by a foreign or domestic investor, then matches target and foreign firms based on similarity of firm characteristics, eliminating differences between treatment and control groups. Difference-in-differences methods are also used to alleviate other systematic differences, removing unobservable time-invariant characteristics between control and treatment groups. Through this, the performance gap between firms acquired by domestic or foreign firms can be studied using linear regression. The authors find that firms acquired by foreign firms experience a statistically significant increase in profitability for the first two years after acquisition, suggesting transfer of superior knowledge from FDI. However, these effects shrink after year 3 after acquisition. Investors from Europe or the USA also have greater profitability gain compared to Asian investors, suggesting superior technology-transfer ability from these firms.

2.4. The impact of outward FDI on the performance of Chinese Firms (Cozza et al., 2015)

PM-DID is again used when studying the impact of outward FDI on Chinese firm performance by Cozza et al. (2015). They used OLS regression, propensity-score matching and DID to examine FDI effects. They find a significant increase in productivity is apparent in firms that have outward FDI, 20%-58% based on the productivity measure used. However, this only materialises a few years after the investment is made.

3 Data Description and Analysis

The data we use in this study is based off a non-experimental dataset. The data is from a developing country, containing a non-treatment variable FDI2016. There are also variables indexed by 2017 which are outcome variables and variables indexed by 2015 which are potential pre-treatment variables used as conditioning covariates. This section provides support for why we wish to use a propensity score-based estimation.

Table 1 shows a list of all variables used in the analysis, with abbreviations and a brief description for each:

Table 1:

Variable	Abbreviation	Description
Total Factor Productivity	TFP	Productivity of all inputs combined. Similar measure to productivity used
Foreign Direct Investment	FDI	Dummy Variable for if FDI occurred (in 2016)
Log of Wages	logwage	Log of Wages spent by a firm in a given year. Shows if wages change after FDI
Log of Employment	logemp	Log of Employment by a firm in a given year. Shows if Employment changes after FDI
Export Intensity	EXP	Amount of sales to exported markets.
Log of Debts	DEBTS	Measure of debt in a given year. Show if debt levels change after FDI
Research and Development	R&D	Dummy variable for if R&D takes place.
Industry Technology Intensity	TECH	Nominal variable for the level of technology in the firms' industry
Access to Ports	PORT	Dummy variable for firm being within 500km of a port
Type of Firm Ownership	OWN	Nominal variable for ownership type of firm

We now look at the data summaries listed below, the first one consisting of firm characteristics of firms that received FDI before the treatment. The second consists of firm characteristics for firms that did not receive FDI, also before the treatment.

Table 2: Firms that received FDI before treatment

Variable	Observations	Mean	Standard Deviation	Min	Max
TFP2015	4,016	2.817868	2.001289	-5.359266	10.82878
logemp2015	4,016	5.402358	2.743602	-4.201547	15.99303
logwages2015	4,016	7.021345	3.782192	-7.331795	21.31597
EXP2015	4,016	.2041439	.0758837	.0167442	.4831533
RD2015	4,016	.127988	.3341181	0	1

Table 3: Firms that did not receive FDI before treatment

Variable	Observations	Mean	Standard Deviation	Min	Max
TFP2015	5,491	3.17855	2.077289	-3.947462	10.2859
logemp2015	5,491	3.738653	3.080017	-6.228763	14.9902
logwages2015	5,491	7.515291	3.861755	-5.625238	22.43151
EXP2015	5,491	.1305354	.0687217	.0103205	.3810638
RD2015	5,491	.112912	.3165141	0	1

Comparing the tables, we see that in reference to TFP, firms that received FDI seem to have a lower mean value of TFP in 2015 (pre-investment) compared to firms that did not. This implies that the FDI is provided to firms that needed it more. Naturally, less productive firms were targeted for the FDI implementation.

Figure 1

Figure 1 shows export intensity is considerably higher for those receiving. This means that those who export more experience higher gains in FDI. The most logical explanation for this is that exporting firms have an already established influence and so already have a relationship with firms. This gives us further evidence of pre-treatment characteristics differing.

Figure 2

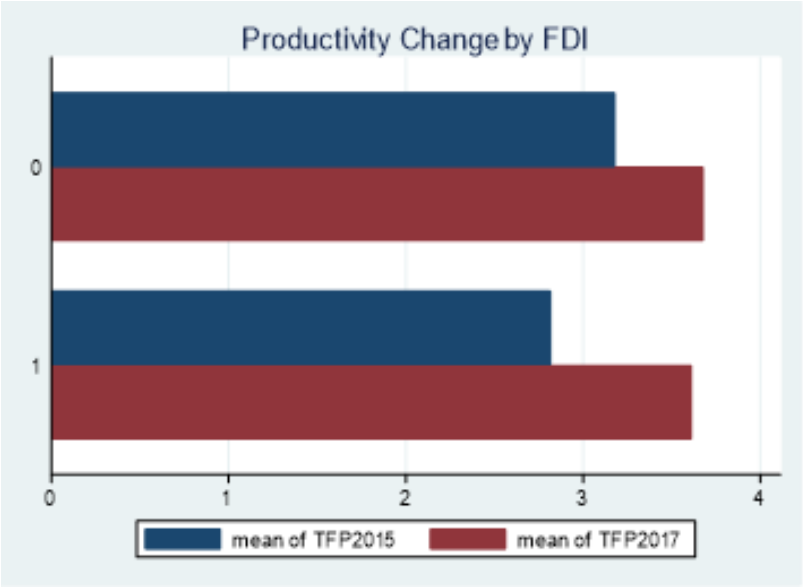
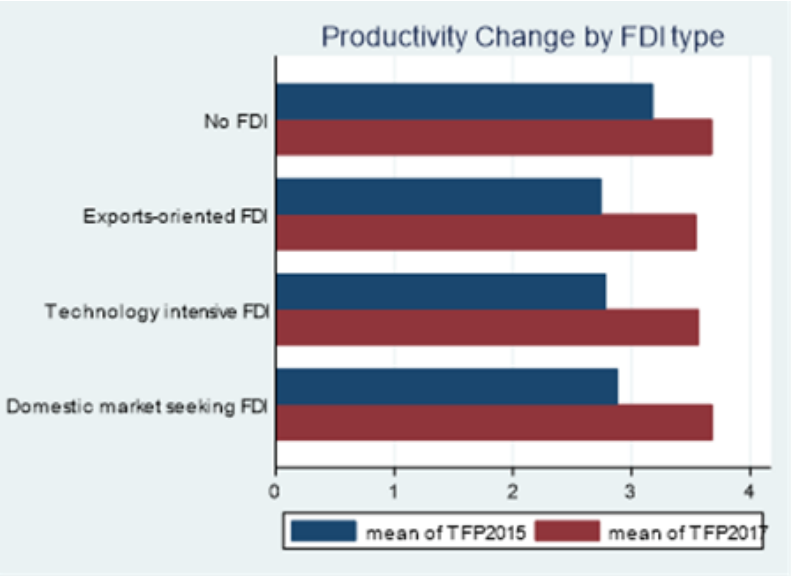


Figure 3



Figures 2&3 analyze the Productivity Changes by FDI and FDI type respectively. Figure 2 points at a pre-treatment characteristic difference – TFP was higher in the group that had no FDI than the group receiving FDI. Moreover, Figure 3 shows that there does not seem to be much difference in TFP for FDI type. Overall, looking at both figures, when firms were treated with FDI, the graph shows there is greater relative increase in TFP for those firms receiving FDI than firms that had did not receive FDI, indicating that FDI seems to increase a firm's TFP.

Figure 4

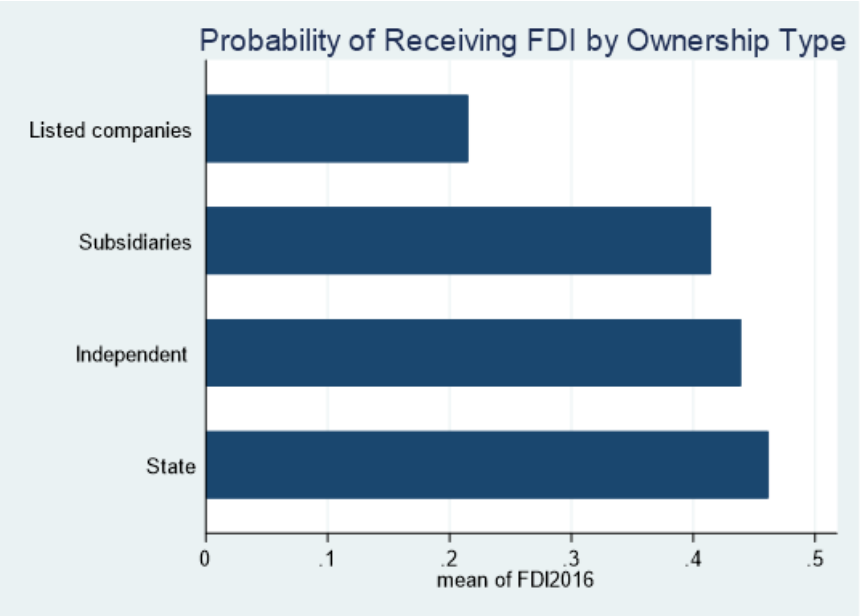


Figure 4 displays the probabilistic level of FDI that firms received based on their ownerships. From this, it is evident that listed companies are less likely to receive FDI. This seems understandable since listed companies have far better access to capital, due to which they are less likely to need FDI.

We have found evidence that receiving FDI increases firm TFP but must investigate whether it is a causal relationship. Also, there is evidence that pre-treatment characteristics are different which is expected of observational data. Hence a difference-in-differences estimator would only create biased inferences. Therefore, in the following sections we make use of conditional independence assumption (CIA) which states that after conditioning on a set of covariates, treatment assignment is then independent of potential outcomes, and use propensity score-based estimators to find the causal relationship.

4 Econometric Methodology and Results

Given we are using observational data, it is likely that potential outcomes and treatment are not independent so a simple difference-in-difference estimator would be biased. This is supported by the data section, which shows that the pre-treatment characteristics of the data are different and therefore likely to be systematically correlated with the likelihood of being treated. Instead, we make use of the CIA which states that after conditioning on a set of observed co-variates, the treatment and potential outcomes are independent. Here, due to the number of co-variates we will condition on, we use propensity score-based estimators by conditioning on a scalar function of X. We can do this due to the statistical property that if CIA holds conditional on X, then it will also hold conditional on π=π(X)π=πX. The core methodology behind propensity score matching is to estimate the counterfactual for the treated individual and then use one or several observations in the control group that are similar in terms of their estimated propensity score.

4.1 Nearest Neighbour Matching

Firstly, we use the nearest-neighbour matching estimator to evaluate the casual effects of Foreign Direct Investment [FDI] on Total Factor Productivity. The formula for this is in Equation 1.

Equation 1

$$ATT^M = \frac{1}{N_1} \sum_{i \epsilon \{d_i = 1\}} \left(y_i - \sum_{j \epsilon \{d_j = 0\}} \omega(i,j)\, y_j \right)$$

$$\omega(i,j) = 1 \text{ if } |\pi_i - \pi_j| \text{ is the smallest; 0 else.}$$

Where $w(i,j)$ is the weight given when matching treated unit i with untreated unit j. With the nearest-neighbour matching estimator, for each treated unit i, the weight function gives a value of 1 to control unit j that is the nearest or the closest in terms of the value of the propensity score; and 0 to all other units. In this example we extend the idea of nearest-neighbour matching to two nearest-neighbours.

Table 4 shows the model specifications used for this estimation:

	Outcome	Treatment	π^[Xi]π^Xi	Estimator
Model 1	Total Factor Productivity	FDI	Log of wage (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015), **R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership**	Nearest Neighbour
Model 2	Total Factor Productivity	FDI	Log of wage (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015), **R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership**	Nearest Neighbour
Model 3	Total Factor Productivity	FDI	Log of wage (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015), **R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership**	Nearest Neighbour

The variables in bold are categorical variables and the variables not in bold are continuous. We interacted all the categorical variables with the continuous ones and used a logistic regression. For the first regression, the two nearest neighbours were calculated.

The result from running this regression is Model 1 in Table 5. Whilst the CIA is essentially untestable, we can construct an idea of its validity by testing the covariate balancing. When checking if the covariates were balanced, we found that most of them were not as shown in Table 10 in the appendix.

Table 5

	ATE coefficient	Robust Standard Error	P>|Z|	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)
Model 1	1.000461	0.4032284	0.013	0.2101473	1.790774
Model 2	0.4774228	0.0481858	0.000	0.3829803	0.5718653
Model 3	0.447006	0.0401275	0.000	0.3683575	0.5256545

Another regression was run to find what was making the covariates unbalanced. We ran the same regression as in Model 1 but removed the export intensity covariate (Model 2). Examining these results, the regression has the finding that FDI has a positive impact on TFP, and the coefficient falls to 0.477. The covariates are now all balanced (Appendix, Table 11).

When more observations are used to match treated units, the efficiency gains are considerably higher, but with this, comes a greater risk of finite sample bias because of the potential danger of matching too dissimilar pairs. To diminish this concern, we can specify propensity score differentials to not exceed a pre-specified tolerance level known as the caliper. Establishing a caliper improves the quality of matches and so reduces bias. In Model 3, we impose a caliper of 0.10 and the results are shown in Table 5. FDI still has a positive impact on productivity and the coefficient has slightly reduced to 0.447. When running the balance test, all covariates are strongly balanced (Appendix, Table 12).

4.2 Inverse-Propensity Weighting

In addition to nearest-neighbour and caliper matching, we can test robustness of the results with a different estimator, the Augmented Inverse-Propensity Weighting (AIPW) estimator. This approach combines covariant adjusted regression with inverse propensity weighting (IPW) to get a doubly robust estimator. With IPW the appropriateness of the model depends on estimating the propensity scores correctly, and with covariant adjusted regressions the functional form of the conditional mean must be correct. With AIPW, only one of these needs to be correct so one of its advantages is it leaves some room for specification error whilst still getting unbiased inference. We derive the doubly robust estimator as follows:

Equation 2

$$\Delta_{DR} = \Delta_{DR1} - \Delta_{DR0}$$

$$\Delta_{DR1} = \frac{1}{N}\sum_{i=1}^{N}\left[\frac{d_i Y_i}{\hat{\pi}[X_i]} - \frac{(d_i - \hat{\pi}[X_i])\hat{F}_1[X_i]}{\hat{\pi}[X_i]}\right]$$

$$\Delta_{DR0} = \frac{1}{N}\sum_{i=1}^{N}\left[\frac{(1-d_i)Y_i}{1-\hat{\pi}[X_i]} - \frac{(d_i - \hat{\pi}[X_i])\hat{F}_0[X_i]}{1-\hat{\pi}[X_i]}\right]$$

$$E[Y_i(0)|X_i] = F_0[X_i]$$

$$E[Y_i(1)|X_i] = F_1[X_i]$$

where $\hat{\pi}[X_i]$ represents the fitted propensity score aspect of the model and $\hat{F}_1[X_i]$ and $\hat{F}_0[X_i]$ are the estimated counterparts of the specified regression function models for potential outcomes under treatment and no treatment respectively.

where the set of continuous covariates x, are interacted with the set of categorical variables z.

First, we run Model 4. Once again, we are required to check the covariate balancing. Here the weighted variance ratios are all below 2 which is indicative that the CIA holds, and most of the weighted standardized differences are also within acceptable values, which is below 20%. However, there were 3 values are outside of this range, with two of these being the interaction between export intensity and low-tech firms, and between export intensity firms undertaking no R&D in 2015. As there are covariate balance issues we can aim to do better. Export intensity seemed to be a problematic value, so was removed from the propensity score-based part of the estimator to give Model 5.

We find the balance drastically improves in Model 5, with all weighted standardised differences within the 10% range. Furthermore, all weighted variance ratios remain below 2 so are still acceptable. We can then move onto inference being more confident in our results. We find receiving FDI has a significant and positive effect on TFP the following year, indicating that receiving FDI increases total factor productivity by 0.30. This supports the direction of the relationship found with the nearest neighbour and caliper matching estimators, albeit with a smaller magnitude.

We then test the sensitivity of these results to different specifications. We test different specifications listed in Table 7 and find that the results remain robust with covariate balancing being satisfactory in all specifications. The coefficient is similar in all specifications, indicating the results are not sensitive to different covariates, bolstering our faith in the results.

Table 6 shows different model specifications used:

	Estimator	Outcome	Treatment	$\widehat{F}[X_i]$	$\hat{\pi}[X_i]$
Model 4	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**
Model 5	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**
Model 6	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Type of firm ownership)**	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Type of firm ownership)**
Model 7	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015))	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015))
Model 8	AIPW	Total Factor Productivity	FDI	x=(Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015))	x=(Total factor productivity (2015), Log of employment (2015), Log of debts (2015)
Model 9	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**
Model 10	AIPW	Total Factor Productivity	FDI	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Export intensity (2015), Log of debts (2015), Log of wages squared (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**	x=(Log of wages (2015), Total factor productivity (2015), Log of employment (2015), Log of debts (2015), Log of wages squared (2015)) **z=(R&D (2015), Industry technology intensity, Access to ports, Type of firm ownership)**

Table 7

	ATE coefficient	Robust standard error	$P > \|z\|$	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)
Model 5	0.302032	0.0104749	0.000	0.2815016	0.3225624
Model 6	0.2987234	0.0100799	0.000	0.2789671	0.3184797
Model 7	0.3047498	0.0071278	0.000	0.2907797	0.31872
Model 8	0.3045713	0.0070801	0.000	0.2906946	0.3184481
Model 9	0.2908108	0.008266	0.000	0.2746098	0.3070119
Model 10	0.2985354	0.0102507	0.000	0.2784444	0.3186265

To conclude this section, after looking at different estimators and specifications, we can see that there is emphatic evidence that receiving FDI has a positive impact on a firm's total factor productivity. This supports the literature we analysed on studies such as Cozza et al. (2015) who found an increase in productivity in firms participating in FDI and supports the spill-over theory presented by Girma et al. (2015) that firm productivity is increased due to FDI**.** The magnitude of the effect is smaller for the AIPW estimator than for the nearest neighbour matching estimator, however, due to better covariate balance values we conclude that the AIPW estimator is more accurate and so would prefer this over the nearest neighbour matching estimator. Hence a firm receiving FDI will increase TFP by 0.30 the following year.

5 Econometric Analysis with FDI Type

In this section, we hypothesize whether TFP effects established in the previous section, vary according to the type of FDI received by the firms. To analyse this, we extended on the AIPW logit model using the doubly robust estimator in section 3 by choosing the multinomial logit model using 3 types of FDI given in the data set:

i) Exports-Oriented

ii) Technology Intensive

iii) Domestic Market Seeking

For this model, we used the *osample(newvar)* function on STATA which specifies and excludes observations that violate the overlap assumption. The results found are given below:

Table 8

TFP2017	Coefficient	Robust Std. Error	P>|z|	[95% Conf.Interval]
(Exports-oriented FDI vs No FDI)	.35478	. 0221191	0.00	.3141253 .4008307
Technology intensive FDI vs No FDI)	. 2989019	. 0184879	0.00	.2626662 .3351375
(Domestic market seeking FDI vs No FDI)	. 3067985	. 0179783	0.00	.27156818 .3420353

According to the results, the coefficients are still in a positive direction (indicating that each type of FDI introduced increased productivity) with the results for each type being 0.36, 0.30, and 0.31 units respectively. These results were insignificant from each other since we find all three confidence intervals overlap.

However, upon looking at the covariates balancing test, we found some points to be unbalanced. We then use different models, excluding different variables to achieve balance:

a. **Model 12** - EXP2015: eliminate the EXP2015 variable. We find similar positive coefficients, being 0.3, 0.29, and 0.29 units respectively, still with overlapping confidence intervals, but with balanced covariates

b. **Model 13** - PORT: Same results as Model 11, with coefficients - 0.3, 0.29, 0.29 units respectively, with overlapping confidence intervals but balanced covariates.

c. **Model 14** - TECH: eliminate the TECH variable, the covariates are balanced. However, received similar results in the same direction as Model 11 - 0.34, 0.3, 0.3 respectively, but with overlapping confidence intervals.

d. **Model 15** - OWN: eliminating the OWN variable, we receive the most balanced covariates compared to the models so far. However, even though the coefficients are positive and significant (with similar values to Models 11-13), the confidence intervals still overlap, therefore displaying no significance.

Table 9: Comparison of Models 11-15

	ATE Coefficient	Robust St. Error	P > |z|	95% Confidence Interval (Lower Bound)	95% Confidence Interval (Upper Bound)
Model 12					
Exports-oriented FDI vs No FDI	.2955973	.0178870	0.000	.2605394	.3306552
Technology intensive FDI vs No FDI	.2916459	.0137521	0.000	.2646922	.3185996
Domestic market seeking FDI vs No FDI	.2915941	.0106734	0.000	.2706745	.3125137
Model 13					
Exports-oriented FDI vs No FDI	.3017025	.0169757	0.000	.2684307	.3349742
Technology intensive FDI vs No FDI	.2917959	.0128654	0.000	.2665800	.3170117
Domestic market seeking FDI vs No FDI	.2893062	.0103780	0.000	.2689656	.3096468
Model 14					
Exports-oriented FDI vs No FDI	.3406189	.0160678	0.000	.3091266	.3721111
Technology intensive FDI vs No FDI	.3010163	.0133265	0.000	.2748968	.3271358
Domestic market seeking FDI vs No FDI	.3108830	.0130136	0.000	.2853768	.3363892
Model 15					
Exports-oriented FDI vs No FDI	.2957914	.0172348	0.000	.2620118	.3295710
Technology intensive FDI vs No FDI	.2872771	.0128610	0.000	.2620701	.3124841
Domestic market seeking FDI vs No FDI	.2910841	.0101935	0.000	.2711053	.3110629

Even after trying multiple models with different variables excluded to achieve covariates balancing, we received similar results with reference to the types of FDI implementation - overlapping confidence intervals. Therefore, we conclude that FDI type does not seem to matter, with all of them affecting productivity positively.

6 Conclusion

In this paper, we aimed to find how FDI impacts Productivity through the use of a propensity score-based estimator. Our analysis find that we do find a significantly positive effect of FDI on Total Factor Productivity. When using Nearest Neighbour Matching, we find coefficients of around 0.45, before and after controlling for finite sample bias. AIPW also finds coefficients around the 0.30 mark for all specifications of models, controlling for different variables. Our results do not suffer covariate balance issues; hence these results are reliable. Our results are similar to the results of Girma et al. (2015), which also studies the effects of FDI on firm productivity and concludes that higher levels of Foreign Owned firms in an analysed cluster leads to higher productivity in that cluster.

We also run tests on the different types of FDI, and their impacts on TFP. These results find that the coefficients are still all positive when controlling for the type of FDI being implemented into a firm. All coefficients remain around 0.30; the same as the AIPW case. The occurrence of overlapping confidence intervals seems to make sense, as upon analysing Figure 4, we see that the productivity change by FDI type is consistent across groups, concluding that FDI type is irrelevant to productivity change.

Further analysis on this topic could look at different outcome variables, such as export intensity or level of innovation; a limitation to the second is that we do not have data for that in our dataset, so alternative data would have to be used. Further analysis could also examine if spillovers are present.

7. References

Cozza, C., Rabellotti, R. and Sanfilippo, M., 2015. The impact of outward FDI on the performance of Chinese firms. *China Economic Review*, [online] 36, pp.42-57. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S1043951X1500108X>.

García, F., Jin, B. and Salomon, R., 2013. Does inward foreign direct investment improve the innovative performance of local firms?. *Research Policy*, [online] 42(1), pp.231-244. Available at: <https://ideas.repec.org/a/eee/respol/v42y2013i1p231-244.htmlhttps://ideas.repec.org/a/eee/respol/v42y2013i1p231-244.html>.

Girma, S., Gong, Y., Gorg, H. and Lancheros, S., 2014. Estimating Direct and Indirect Effects of Foreign Direct Investment on Firm Productivity in the Presence of Interactions between Firms. *Journal of International Economics*, [online] 95(1), pp.157-169. Available at: <https://www-sciencedirect-com.nottingham.idm.oclc.org/science/article/pii/S0022199614001391>.

Song, Y. and Lie, H., 2018. Does heterogeneity matter to the direct effect of FDI on firm performance?. *International Journal of Emerging Markets*, [online] 13(6), pp.1876-1906. Available at: <https://www.emerald.com/insight/content/doi/10.1108/IJoEM-12-2017-0564/full/html>.

8 Appendix

8.1 A

Table 10 – Model 1 Balance

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
TECH# logemp2015				
Low-tech ind~s	.4585515	.1708563	1.539431	.9917206
Medium low-t~s	.2282486	-.2290151	1.939764	.4618267
Medium high-~s	.0999325	.0916173	1.379698	.9350198
High-tech in~s	-.2259397	.1875791	.6580113	2.09004
OWN# logemp2015				
Listed compa~s	-.0814176	.3008896	.8978625	3.27746
Subsidiaries	.1438597	.0342375	1.489322	1.05024
Independent	.2679932	.0852616	1.410005	.8858847
PORT# logemp2015				
No ports wit~m	.1378421	.0308341	1.271142	.8516829
RD2015# logemp2015				
0	.4522918	.1775609	1.003116	.6955566
TECH# logwages2015				
Low-tech ind~s	.4119221	.208363	1.455427	1.06624
Medium low-t~s	.0889727	-.1499954	1.171327	.7733187
Medium high-~s	-.1872788	-.047938	.7999814	1.061261
High-tech in~s	-.4855367	.0559962	.2715601	1.444956
OWN# logwages2015				
Listed compa~s	-.2287944	.1256381	.3839336	2.256071
Subsidiaries	-.0476632	-.0328762	.8794028	.9852854
Independent	.0014519	.0281097	.9501732	.8940735
PORT# logwages2015				
No ports wit~m	-.3773554	-.145638	.9102569	.8179992
RD2015# logwages2015				
0	-.1228987	.0911691	.9414375	1.154571
TECH# EXP2015				
Low-tech ind~s	.873239	.3265977	4.70492	1.854286
Medium low-t~s	.3443242	-.1901089	4.410455	.5817123
Medium high-~s	.1556073	-.0745211	2.359197	.9673134
High-tech in~s	-.354229	.1274319	.7254736	2.17264
OWN# EXP2015				
Listed compa~s	-.156848	-.0520346	.8079586	1.057036
Subsidiaries	.2132438	.0948384	2.167323	1.683495
Independent	.3942959	.1333105	2.397392	1.434321
PORT# EXP2015				
No ports wit~m	.0613273	-.0396943	1.811699	1.193952
RD2015# EXP2015				
0	.7013905	.1324435	1.623716	1.402649
TECH# TFP2015				
Low-tech ind~s	.3818298	.1386673	1.506694	1.13926
Medium low-t~s	.0502113	.0209433	1.04035	.9617782
Medium high-~s	-.2515831	.148855	.6229189	2.470442
High-tech in~s	-.4818266	-.0036457	.2243842	1.010771
OWN# TFP2015				
Listed compa~s	-.2584394	.0990721	.2744028	1.480349
Subsidiaries	-.0570754	-.0303139	.8302435	.9530895
Independent	-.0476242	-.0153444	.873825	.9467081
PORT# TFP2015				
No ports wit~m	-.4376443	-.189504	.7234664	.7902315
RD2015# TFP2015				
0	-.1795348	.2616329	.8988655	1.57287
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.1729019	1.472903	1.186105
Medium low-t~s	.082927	-.182747	1.227199	.6692058
Medium high-~s	-.1950101	.092523	.7455508	1.700554
High-tech in~s	-.4558673	.0378253	.2410966	1.175874
OWN# DEBTS2015				
Listed compa~s	-.2356009	.1343372	.3445064	2.15684
Subsidiaries	-.0464365	-.0296559	.8798814	.954513
Independent	-.0276459	.0610878	.9364147	1.07835
PORT# DEBTS2015				
No ports wit~m	-.3285498	-.0945525	.903176	.9500985
RD2015# DEBTS2015				
0	-.0784451	.1449786	1.028668	1.275061

Table 11 – Model 2 Balance

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
TECH#				
logemp2015				
Low-tech ind~s	.4585515	.0231028	1.539431	.9885992
Medium low-t~s	.2282486	.0251348	1.939764	1.090306
Medium high-~s	.0999325	-.0021523	1.379698	.9767421
High-tech in~s	-.2259397	.179599	.6580113	1.418175
OWN#				
logemp2015				
Listed compa~s	-.0814176	.0860289	.8978625	1.429518
Subsidiaries	.1438597	-.0039295	1.489322	1.001943
Independent	.2679932	.0666226	1.410005	1.020338
PORT#				
logemp2015				
No ports wit~m	.1378421	.0548394	1.271142	.9868169
RD2015#				
logemp2015				
0	.4522918	.1177646	1.003116	.8935197
TECH#				
logwages2015				
Low-tech ind~s	.4119221	.0190184	1.455427	1.013255
Medium low-t~s	.0889727	-.0259727	1.171327	.9196019
Medium high-~s	-.1872788	-.0202373	.7999814	1.082531
High-tech in~s	-.4855367	.1896262	.2715601	1.920168
OWN#				
logwages2015				
Listed compa~s	-.2287944	.0872541	.3839336	1.493477
Subsidiaries	-.0476632	-.0192594	.8794028	1.084429
Independent	.0014519	.0732191	.9501732	1.322068
PORT#				
logwages2015				
No ports wit~m	-.3773554	.0494421	.9102569	1.297471
RD2015#				
logwages2015				
0	-.1228987	.0867269	.9414375	1.2843
TECH#				
TFP2015				
Low-tech ind~s	.3818298	.027088	1.506694	1.003609
Medium low-t~s	.0502113	-.0376139	1.04035	.8443365
Medium high-~s	-.2515831	-.0601378	.6229189	.8731024
High-tech in~s	-.4818266	.1690893	.2243842	1.583059
OWN#				
TFP2015				
Listed compa~s	-.2584394	.0916654	.2744028	1.461337
Subsidiaries	-.0570754	-.0557918	.8302435	.8268551
Independent	-.0476242	.0312837	.873825	1.077046
PORT#				
TFP2015				
No ports wit~m	-.4376443	-.0047786	.7234664	1.017449
RD2015#				
TFP2015				
0	-.1795348	.0201834	.8988655	.9626059
TECH#				
DEBTS2015				
Low-tech ind~s	.3555754	.0055855	1.472903	.9913697
Medium low-t~s	.082927	-.0361236	1.227199	.890023
Medium high-~s	-.1950101	-.0384199	.7455508	.9834549
High-tech in~s	-.4558673	.0924782	.2410966	1.339394
OWN#				
DEBTS2015				
Listed compa~s	-.2356009	.0322984	.3445064	1.080503
Subsidiaries	-.0464365	-.0569471	.8798814	.8837568
Independent	-.0276459	-.0128627	.9364147	.9701375
PORT#				
DEBTS2015				
No ports wit~m	-.3285498	-.0946546	.903176	.9650508
RD2015#				
DEBTS2015				
0	-.0784451	-.0128093	1.028668	1.06683

Table 12 – Model 3 Balance

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
TECH# logemp2015				
Low-tech ind~s	.4585515	.0244715	1.539431	.9948613
Medium low-t~s	.2282486	.0307935	1.939764	1.108127
Medium high-~s	.0999325	.0007567	1.379698	.986572
High-tech in~s	-.2259397	.1794437	.6580113	1.453061
OWN# logemp2015				
Listed compa~s	-.0814176	.1066615	.8978625	1.579505
Subsidiaries	.1438597	.0062777	1.489322	1.019253
Independent	.2679932	.0559927	1.410005	1.019075
PORT# logemp2015				
No ports wit~m	.1378421	.0583034	1.271142	.9999729
RD2015# logemp2015				
0	.4522918	.1216691	1.003116	.9035702
TECH# logwages2015				
Low-tech ind~s	.4119221	.0095086	1.455427	1.000906
Medium low-t~s	.0889727	-.0229561	1.171327	.9196202
Medium high-~s	-.1872788	-.0176833	.7999814	1.077855
High-tech in~s	-.4855367	.1867329	.2715601	1.915611
OWN# logwages2015				
Listed compa~s	-.2287944	.0924347	.3839336	1.586144
Subsidiaries	-.0476632	-.0055419	.8794028	1.125125
Independent	.0014519	.0615305	.9501732	1.265062
PORT# logwages2015				
No ports wit~m	-.3773554	.0396182	.9102569	1.282182
RD2015# logwages2015				
0	-.1228987	.0940776	.9414375	1.286024
TECH# TFP2015				
Low-tech ind~s	.3818298	.0175139	1.506694	.9959237
Medium low-t~s	.0502113	-.0280172	1.04035	.8812626
Medium high-~s	-.2515831	-.0561793	.6229189	.8685292
High-tech in~s	-.4818266	.155942	.2243842	1.517408
OWN# TFP2015				
Listed compa~s	-.2584394	.0881047	.2744028	1.453532
Subsidiaries	-.0570754	-.0422313	.8302435	.8595524
Independent	-.0476242	.0251657	.873825	1.056359
PORT# TFP2015				
No ports wit~m	-.4376443	-.0196846	.7234664	.996448
RD2015# TFP2015				
0	-.1795348	.0117071	.8988655	.945781
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.0095139	1.472903	.9999191
Medium low-t~s	.082927	-.0247504	1.227199	.9070464
Medium high-~s	-.1950101	-.0330115	.7455508	.9906768
High-tech in~s	-.4558673	.0832325	.2410966	1.286096
OWN# DEBTS2015				
Listed compa~s	-.2356009	.0466228	.3445064	1.168981
Subsidiaries	-.0464365	-.0422242	.8798814	.9077137
Independent	-.0276459	-.0035567	.9364147	.9982392
PORT# DEBTS2015				
No ports wit~m	-.3285498	-.080754	.903176	.9831078
RD2015# DEBTS2015				
0	-.0784451	-.0047964	1.028668	1.04565

Table 13 – Model 4 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
RD2015# logwages2015				
0	-.1228987	-.0759391	.9414375	1.007672
1	.011715	-.0226853	.9978027	.9266666
TECH# logwages2015				
Low-tech ind~s	.4119221	.1690959	1.455427	1.001736
Medium low-t~s	.0889727	.0226315	1.171327	1.028722
Medium high-~s	-.1872788	-.1432813	.7999814	.8597184
OWN# logwages2015				
Listed compa~s	-.2287944	-.0584009	.3839336	.8915942
Subsidiaries	-.0476632	-.0521876	.8794028	.9622594
Independent	.0014519	.0198712	.9501732	.9186028
PORT# logwages2015				
No ports wit~m	-.3773554	-.1515954	.9102569	.8655009
RD2015# TFP2015				
0	-.1795348	-.0959244	.8988655	1.016265
1	.0204056	-.0369657	1.007662	.9689792
TECH# TFP2015				
Low-tech ind~s	.3818298	.116269	1.506694	1.032839
Medium low-t~s	.0502113	.0081574	1.04035	.9619986
Medium high-~s	-.2515831	-.1258578	.6229189	.9358132
OWN# TFP2015				
Listed compa~s	-.2584394	-.0988577	.2744028	.6055302
Subsidiaries	-.0570754	-.0502123	.8302435	.9117615
Independent	-.0476242	-.0259183	.873825	.9185164
PORT# TFP2015				
No ports wit~m	-.4376443	-.206195	.7234664	.7837231
RD2015# logemp2015				
0	.4522918	.1279079	1.003116	.8198927
1	.1358745	.004429	1.616522	.9898287
TECH# logemp2015				
Low-tech ind~s	.4585515	.1460352	1.539431	.9618645
Medium low-t~s	.2282486	.0385074	1.939764	.9541199
Medium high-~s	.0999325	-.0232109	1.379698	.93344
OWN# logemp2015				
Listed compa~s	-.0814176	.029048	.8978625	1.373526
Subsidiaries	.1438597	.0212511	1.489322	1.028338
Independent	.2679932	.0866167	1.410005	.9107232
PORT# logemp2015				
No ports wit~m	.1378421	.0399869	1.271142	.8565574
RD2015# DEBTS2015				
0	-.0784451	-.0408776	1.028668	1.060948
1	.0355241	-.0348021	1.147904	.9142234
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.1268283	1.472903	1.079735
Medium low-t~s	.082927	.0212121	1.227199	1.028334
Medium high-~s	-.1950101	-.1097891	.7455508	.9538502
OWN# DEBTS2015				
Listed compa~s	-.2356009	-.0691854	.3445064	.8112344
Subsidiaries	-.0464365	-.0591993	.8798814	.8850756
Independent	-.0276459	.035398	.9364147	1.019649
PORT# DEBTS2015				
No ports wit~m	-.3285498	-.1246559	.903176	.9473979
RD2015# EXP2015				
0	.7013905	.2212483	1.623716	1.729006
1	.1897957	.0267576	2.533283	1.333063
TECH# EXP2015				
Low-tech ind~s	.873239	.304098	4.70492	1.649645
Medium low-t~s	.3443242	.111	4.410455	1.565812
Medium high-~s	.1556073	.0168749	2.359197	1.493929
OWN# EXP2015				
Listed compa~s	-.156848	-.0305319	.8079586	1.260564
Subsidiaries	.2132438	.0708722	2.167323	1.555402
Independent	.3942959	.1455744	2.397392	1.437794
PORT# EXP2015				
No ports wit~m	.0613273	-.0213109	1.811699	1.253503

Table 14 – Model 5 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
RD2015# logwages2015				
0	-.1228987	-.0023532	.9414375	1.108375
1	.011715	.0293418	.9978027	1.114509
TECH# logwages2015				
Low-tech ind~s	.4119221	.0468522	1.455427	.9833643
Medium low-t~s	.0889727	.015267	1.171327	1.005163
Medium high-~s	-.1872788	-.0181116	.7999814	1.044132
OWN# logwages2015				
Listed compa~s	-.2287944	-.0201236	.3839336	.9923575
Subsidiaries	-.0476632	-.0097559	.8794028	1.025514
Independent	.0014519	.0307146	.9501732	1.103616
PORT# logwages2015				
No ports wit~m	-.3773554	-.0295064	.9102569	1.111777
RD2015# TFP2015				
0	-.1795348	-.0375263	.8988655	.9132916
1	.0204056	.0333819	1.007662	1.127549
TECH# TFP2015				
Low-tech ind~s	.3818298	.0394162	1.506694	.9736295
Medium low-t~s	.0502113	.0117653	1.04035	.9774841
Medium high-~s	-.2515831	-.0376028	.6229189	.8790874
OWN# TFP2015				
Listed compa~s	-.2584394	-.0308726	.2744028	.8829127
Subsidiaries	-.0570754	-.0236437	.8302435	.8791706
Independent	-.0476242	.0147853	.873825	1.00214
PORT# TFP2015				
No ports wit~m	-.4376443	-.060003	.7234664	.9165476
RD2015# logemp2015				
0	.4522918	.0781641	1.003116	.7839831
1	.1358745	.0325886	1.616522	1.033371
TECH# logemp2015				
Low-tech ind~s	.4585515	.0472442	1.539431	.9345212
Medium low-t~s	.2282486	.0193229	1.939764	.8987977
Medium high-~s	.0999325	.0196733	1.379698	.9327228
OWN# logemp2015				
Listed compa~s	-.0814176	.0175444	.8978625	1.159784
Subsidiaries	.1438597	.0148655	1.489322	.9588754
Independent	.2679932	.0477821	1.410005	.9104254
PORT# logemp2015				
No ports wit~m	.1378421	.0472157	1.271142	.9037742
RD2015# DEBTS2015				
0	-.0784451	-.0212325	1.028668	1.006883
1	.0355241	.0087269	1.147904	1.004155
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.0437222	1.472903	.9949675
Medium low-t~s	.082927	.014391	1.227199	1.013797
Medium high-~s	-.1950101	-.02188	.7455508	1.002417
OWN# DEBTS2015				
Listed compa~s	-.2356009	-.0506837	.3445064	.7915399
Subsidiaries	-.0464365	-.0129607	.8798814	.9646905
Independent	-.0276459	.0027328	.9364147	.9806849
PORT# DEBTS2015				
No ports wit~m	-.3285498	-.0615509	.903176	.9933418

Table 15 – Model 6 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
RD2015# logwages2015				
0	-.1228987	.0026782	.9414375	1.095981
1	.011715	.0285735	.9978027	1.13929
TECH# logwages2015				
Low-tech ind~s	.4119221	.0311032	1.455427	.9692365
Medium low-t~s	.0889727	.0076397	1.171327	.9844738
Medium high-~s	-.1872788	-.0147414	.7999814	1.056956
OWN# logwages2015				
Listed compa~s	-.2287944	-.009397	.3839336	1.053875
Subsidiaries	-.0476632	-.0103961	.8794028	1.030494
Independent	.0014519	.0156423	.9501732	1.082537
RD2015# TFP2015				
0	-.1795348	-.0159504	.8988655	.9535702
1	.0204056	.0257511	1.007662	1.092272
TECH# TFP2015				
Low-tech ind~s	.3818298	.0266703	1.506694	.9744799
Medium low-t~s	.0502113	.0060294	1.04035	.9690841
Medium high-~s	-.2515831	-.0295877	.6229189	.9205857
OWN# TFP2015				
Listed compa~s	-.2584394	-.023587	.2744028	.8977324
Subsidiaries	-.0570754	-.0189545	.8302435	.9196693
Independent	-.0476242	.0049341	.873825	1.002136
RD2015# logemp2015				
0	.4522918	.0718963	1.003116	.7749753
1	.1358745	.0261602	1.616522	1.020844
TECH# logemp2015				
Low-tech ind~s	.4585515	.0296179	1.539431	.9120759
Medium low-t~s	.2282486	.0107376	1.939764	.874696
Medium high-~s	.0999325	.0134337	1.379698	.9274397
OWN# logemp2015				
Listed compa~s	-.0814176	.0211947	.8978625	1.170586
Subsidiaries	.1438597	.0110405	1.489322	.9522999
Independent	.2679932	.0358033	1.410005	.9015743
RD2015# DEBTS2015				
0	-.0784451	.0038667	1.028668	1.026616
1	.0355241	.0100554	1.147904	1.016019
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.0308636	1.472903	.9808382
Medium low-t~s	.082927	.0096467	1.227199	1.004763
Medium high-~s	-.1950101	-.016591	.7455508	1.016958
OWN# DEBTS2015				
Listed compa~s	-.2356009	-.0314873	.3445064	.8890122
Subsidiaries	-.0464365	-.0154108	.8798814	.9604669
Independent	-.0276459	.0011775	.9364147	.9811011

Table 16 – Model 7 Balance

	Raw	Weighted
Number of obs =	9,507	9,507.0
Treated obs =	4,016	4,694.2
Control obs =	5,491	4,812.8

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
logwages2015	-.1292315	-.0030867	.9592189	.9730758
TFP2015	-.1768359	-.0022348	.9281661	.9144866
logemp2015	.5704138	.0162709	.7934805	.7547269
DEBTS2015	-.0615218	.0004004	1.055267	1.065061

Table 17 – Model 8 Balance

	Raw	Weighted
Number of obs =	9,507	9,507.0
Treated obs =	4,016	4,697.1
Control obs =	5,491	4,809.9

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
TFP2015	-.1768359	-.0035738	.9281661	.9155226
logemp2015	.5704138	.0159006	.7934805	.7517827
DEBTS2015	-.0615218	.0006902	1.055267	1.067004

Table 13 – Model 9 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
RD2015# logwages2015				
0	-.1228987	-.0023532	.9414375	1.108375
1	.011715	.0293418	.9978027	1.114509
TECH# logwages2015				
Low-tech ind~s	.4119221	.0468522	1.455427	.9833643
Medium low-t~s	.0889727	.015267	1.171327	1.005163
Medium high-~s	-.1872788	-.0181116	.7999814	1.044132
OWN# logwages2015				
Listed compa~s	-.2287944	-.0201236	.3839336	.9923575
Subsidiaries	-.0476632	-.0097559	.8794028	1.025514
Independent	.0014519	.0307146	.9501732	1.103616
PORT# logwages2015				
No ports wit~m	-.3773554	-.0295064	.9102569	1.111777
RD2015# TFP2015				
0	-.1795348	-.0375263	.8988655	.9132916
1	.0204056	.0333819	1.007662	1.127549
TECH# TFP2015				
Low-tech ind~s	.3818298	.0394162	1.506694	.9736295
Medium low-t~s	.0502113	.0117653	1.04035	.9774841
Medium high-~s	-.2515831	-.0376028	.6229189	.8790874
OWN# TFP2015				
Listed compa~s	-.2584394	-.0308726	.2744028	.8829127
Subsidiaries	-.0570754	-.0236437	.8302435	.8791706
Independent	-.0476242	.0147853	.873825	1.00214
PORT# TFP2015				
No ports wit~m	-.4376443	-.060003	.7234664	.9165476
RD2015# logemp2015				
0	.4522918	.0781641	1.003116	.7839831
1	.1358745	.0325886	1.616522	1.033371
TECH# logemp2015				
Low-tech ind~s	.4585515	.0472442	1.539431	.9345212
Medium low-t~s	.2282486	.0193229	1.939764	.8987977
Medium high-~s	.0999325	.0196733	1.379698	.9327228
OWN# logemp2015				
Listed compa~s	-.0814176	.0175444	.8978625	1.159784
Subsidiaries	.1438597	.0148655	1.489322	.9588754
Independent	.2679932	.0477821	1.410005	.9104254
PORT# logemp2015				
No ports wit~m	.1378421	.0472157	1.271142	.9037742
RD2015# DEBTS2015				
0	-.0784451	-.0212325	1.028668	1.006883
1	.0355241	.0087269	1.147904	1.004155
TECH# DEBTS2015				
Low-tech ind~s	.3555754	.0437222	1.472903	.9949675
Medium low-t~s	.082927	.014391	1.227199	1.013797
Medium high-~s	-.1950101	-.02188	.7455508	1.002417
OWN# DEBTS2015				
Listed compa~s	-.2356009	-.0506837	.3445064	.7915399
Subsidiaries	-.0464365	-.0129607	.8798814	.9646905
Independent	-.0276459	.0027328	.9364147	.9806849
PORT# DEBTS2015				
No ports wit~m	-.3285498	-.0615509	.903176	.9933418

Table 13 – Model 10 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
RD2015#				
logwages2015				
0	-.1228987	-.0312459	.9414375	1.007279
1	.011715	.0293021	.9978027	1.101388
TECH#				
logwages2015				
Low-tech ind~s	.4119221	.057292	1.455427	1.050889
Medium low-t~s	.0889727	.0204548	1.171327	1.052817
Medium high-~s	-.1872788	-.0151609	.7999814	.9876521
OWN#				
logwages2015				
Listed compa~s	-.2287944	-.0297155	.3839336	.9033856
Subsidiaries	-.0476632	-.0157723	.8794028	.9790478
Independent	.0014519	.0063746	.9501732	1.001011
PORT#				
logwages2015				
No ports wit~m	-.3773554	-.0597009	.9102569	.9971252
RD2015#				
logwages2015sq				
0	-.130563	-.0262239	.8414798	.9845162
1	.0012865	.0294716	.9784825	1.153824
TECH#				
logwages2015sq				
Low-tech ind~s	.3235894	.0456654	1.707071	1.151888
Medium low-t~s	.0608845	.0182229	1.057237	1.033928
Medium high-~s	-.1517517	-.0104658	.7535862	.9459199
OWN#				
logwages2015sq				
Listed compa~s	-.199391	-.0229725	.3756408	.9207122
Subsidiaries	-.0539852	-.0110532	.8175867	.9676757
Independent	-.018382	.0036746	.9191892	1.033785
PORT#				
logwages2015sq				
No ports wit~m	-.3154721	-.0451694	.7282299	.9476595
RD2015#				
TFP2015				
0	-.1795348	-.0535746	.8988655	.8914569
1	.0204056	.0380491	1.007662	1.148433
TECH#				
TFP2015				
Low-tech ind~s	.3818298	.0477351	1.506694	.988528
Medium low-t~s	.0502113	.0161317	1.04035	.9957335
Medium high-~s	-.2515831	-.0343545	.6229189	.8784907
OWN#				
TFP2015				
Listed compa~s	-.2584394	-.0358065	.2744028	.8607983
Subsidiaries	-.0570754	-.024811	.8302435	.8809667
Independent	-.0476242	-.0008821	.873825	.9589837
PORT#				
TFP2015				
No ports wit~m	-.4376443	-.078736	.7234664	.8861982
RD2015#				
logemp2015				
0	.4522918	.0765415	1.003116	.7840655
1	.1358745	.0353969	1.616522	1.040739
TECH#				
logemp2015				
Low-tech ind~s	.4585515	.0565238	1.539431	.9533839
Medium low-t~s	.2282486	.0236926	1.939764	.9192406
Medium high-~s	.0999325	.0239983	1.379698	.9243097
OWN#				
logemp2015				
Listed compa~s	-.0814176	.0106543	.8978625	1.104691
Subsidiaries	.1438597	.0160931	1.489322	.9625633
Independent	.2679932	.0439044	1.410005	.9084308
PORT#				
logemp2015				
No ports wit~m	.1378421	.041258	1.271142	.8991831
RD2015#				
DEBTS2015				
0	-.0784451	-.0158465	1.028668	1.010434
1	.0355241	.0111389	1.147904	1.014226
TECH#				
DEBTS2015				
Low-tech ind~s	.3555754	.0516865	1.472903	1.011842
Medium low-t~s	.082927	.0184084	1.227199	1.031749
Medium high-~s	-.1950101	-.0198141	.7455508	.9973719
OWN#				
DEBTS2015				
Listed compa~s	-.2356009	-.05642	.3445064	.7667323
Subsidiaries	-.0464365	-.014099	.8798814	.965052
Independent	-.0276459	.0047896	.9364147	.9826433
PORT#				
DEBTS2015				
No ports wit~m	-.3285498	-.0607074	.903176	.9950834

Table 17 – Model 11 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Exports-orien~I				
RD2015#				
logwages2015				
0	-.0541542	.0721738	.8318915	.9164824
1	-.1945958	-.1276693	.4531291	.6129891
TECH#				
logwages2015				
Low-tech ind~s	.4733523	.2222782	1.495926	1.148392
Medium low-t~s	.0662845	-.02346	1.169125	.9305084
Medium high-~s	-.2593147	-.1094963	.6639002	.897046
OWN#				
logwages2015				
Listed compa~s	-.2761357	.0050469	.2732027	1.096564
Subsidiaries	-.0250373	-.0430628	.8988175	.9547003

Independent	-.0119915	.0607484	.9114185	.9942552
PORT# logwages2015				
No ports wit~m	-.4550793	-.1597667	.8433563	.9196915
RD2015# TFP2015				
0	-.1354029	-.0064004	.893344	.9002898
1	-.1254017	-.0990383	.6522027	.6770965
TECH# TFP2015				
Low-tech ind~s	.4370379	.1950716	1.533133	1.109027
Medium low-t~s	.0065753	-.0487099	.9615362	.8500266
Medium high-~s	-.3027689	-.1461676	.5724633	.7619224
OWN# TFP2015				
Listed compa~s	-.2655658	-.055802	.2646161	.6738031
Subsidiaries	-.0367681	-.0785701	.8703571	.8166093
Independent	-.0165524	.0698776	.9444587	1.041724
PORT# TFP2015				
No ports wit~m	-.4901607	-.193328	.7209059	.8295352
RD2015# logemp2015				
0	.5363848	.254458	.8920706	.8631082
1	-.0729152	-.0426134	.7655525	.9075317
TECH# logemp2015				
Low-tech ind~s	.4879265	.1613958	1.420877	1.00639
Medium low-t~s	.2051471	.009455	1.937111	.9907436
Medium high-~s	.0707254	.0093566	1.352592	.9785433
OWN# logemp2015				
Listed compa~s	-.1214545	.1277732	.7305563	2.188553
Subsidiaries	.1779657	.0372894	1.49153	1.053846
Independent	.2615914	.090427	1.385697	.9475502
PORT# logemp2015				
No ports wit~m	.0908027	-.003307	1.279952	.9310996
RD2015# DEBTS2015				
0	.0014402	.0239034	.9957642	1.053103
1	-.1634663	-.128571	.4865911	.6187188
TECH# DEBTS2015				
Low-tech ind~s	.3942379	.1165278	1.51506	1.12232
Medium low-t~s	.0166185	-.0545725	.9690895	.8192222
Medium high-~s	-.2219944	-.1036794	.6853894	.8860041
OWN# DEBTS2015				
Listed compa~s	-.2578455	.0536721	.2945481	1.482185
Subsidiaries	-.0089598	-.0454023	.9509116	.8954143
Independent	-.0022849	.0157599	.995186	1.074202
PORT# DEBTS2015				
No ports wit~m	-.3815924	-.207274	.8475846	.9141448
RD2015# EXP2015				
0	.8767336	.4103405	1.246214	1.683677

1	-.0064585	-.0021903	1.544938	1.439655
TECH# EXP2015				
Low-tech ind~s	.9740526	.3541075	4.743812	1.797541
Medium low-t~s	.3116919	.0868754	4.193308	1.653794
Medium high-~s	.099557	.044806	2.127067	1.509069
OWN# EXP2015				
Listed compa~s	-.1917138	.065108	.6898727	1.826559
Subsidiaries	.2559434	.0884151	2.233648	1.614599
Independent	.3987859	.1897279	2.313002	1.596288
PORT# EXP2015				
No ports wit~m	.0004091	-.0439774	1.764981	1.349292
Technology in~I				
RD2015# logwages2015				
0	-.0536053	-.1649473	.9044123	.9872736
1	-.1068934	.0395197	.668195	1.105053
TECH# logwages2015				
Low-tech ind~s	.4025108	.1423276	1.434181	.9969582
Medium low-t~s	.0973552	.0513053	1.159975	1.052882
Medium high-~s	-.1676979	-.14299	.8571909	.8890623
OWN# logwages2015				
Listed compa~s	-.215073	-.1288808	.3950186	.5417341
Subsidiaries	-.0428047	-.0101659	.9199645	1.029287
Independent	-.0363949	-.0229932	.9073856	.8672308
PORT# logwages2015				
No ports wit~m	-.3457656	-.1594492	.914971	.881719
RD2015# TFP2015				
0	-.1308199	-.1973232	.8555133	.8614527
1	-.1006792	.0535591	.6902483	1.824087
TECH# TFP2015				
Low-tech ind~s	.3692381	.1042781	1.489062	1.003164
Medium low-t~s	.0517049	.0007605	1.001067	.9238384
Medium high-~s	-.2498815	-.176519	.6186846	.7193679
OWN# TFP2015				
Listed compa~s	-.2796787	-.1683281	.2047938	.3581676
Subsidiaries	-.0559005	.0507247	.8588666	1.536694
Independent	-.0676162	-.0816772	.8366525	.8172365
PORT# TFP2015				
No ports wit~m	-.401454	-.2398864	.7256159	.7331342
RD2015# logemp2015				
0	.5479726	.1353893	.9311876	.7834545
1	.0340996	.0683011	1.254864	1.338302
TECH# logemp2015				
Low-tech ind~s	.4677794	.1716172	1.578802	.9863358
Medium low-t~s	.2492258	.077455	2.00882	1.017225
Medium high-~s	.0983891	-.014454	1.364765	.9665943

OWN#				
logemp2015				
Listed compa~s	-.076217	-.0357658	.9111245	.916677
Subsidiaries	.1519498	.0854608	1.540756	1.199776
Independent	.2418484	.1072624	1.349888	.8906297
PORT#				
logemp2015				
No ports wit~m	.1857328	.1000008	1.273007	.8778867
RD2015#				
DEBTS2015				
0	.0084892	-.1275312	1.061434	1.066733
1	-.0617784	-.0130619	.8327392	.9352524
TECH#				
DEBTS2015				
Low-tech ind~s	.370462	.1178112	1.538765	1.148147
Medium low-t~s	.1154457	.0374183	1.324278	.9919404
Medium high-~s	-.1885091	-.1491405	.7904766	.8441983
OWN#				
DEBTS2015				
Listed compa~s	-.2404787	-.1350498	.3249203	.5181759
Subsidiaries	-.0327332	-.0473484	.9389938	.9203668
Independent	-.0552448	-.02837	.9265621	.9677337
PORT#				
DEBTS2015				
No ports wit~m	-.2572081	-.1422156	.9880076	.9580951
RD2015#				
EXP2015				
0	.7705232	.1831087	1.448811	1.545225
1	.0587355	.0970853	1.721835	1.742034
TECH#				
EXP2015				
Low-tech ind~s	.8338702	.3402839	4.486721	1.724004
Medium low-t~s	.3557552	.1466614	4.360977	1.649173
Medium high-~s	.1582277	.0202568	2.3493	1.525147
OWN#				
EXP2015				
Listed compa~s	-.1582341	-.1152577	.7784817	.7725824
Subsidiaries	.2010331	.1343278	2.139324	1.799738
Independent	.3345237	.1665826	2.179003	1.391449
PORT#				
EXP2015				
No ports wit~m	.0948204	.0345883	1.777496	1.279619
Domestic mark~I				
RD2015#				
logwages2015				
0	-.2076405	-.0977527	1.011792	.9953779
1	.1658698	-.0410574	1.468727	.8671913
TECH#				
logwages2015				
Low-tech ind~s	.3891579	.1911736	1.449876	.9336544
Medium low-t~s	.0927593	.005979	1.181059	1.018001
Medium high-~s	-.1708753	-.1920166	.8180526	.7760433
OWN#				
logwages2015				
Listed compa~s	-.2141903	-.0589857	.4340962	.9702318
Subsidiaries	-.0632063	-.0924585	.8377176	.8511784
Independent	.0361392	.0335941	1.000654	.8909986
PORT#				
logwages2015				

No ports wit~m	-.3668146	-.1459842	.9366834	.8048212
RD2015#				
TFP2015				
0	-.2372366	-.1053242	.934099	1.048807
1	.1605228	-.0532476	1.391593	.8508208
TECH#				
TFP2015				
Low-tech ind~s	.3646638	.1056928	1.505683	.985906
Medium low-t~s	.0688381	.0247987	1.107823	1.006654
Medium high-~s	-.2297779	-.1386833	.6494415	.9806498
OWN#				
TFP2015				
Listed compa~s	-.234863	-.1060594	.3429721	.6074933
Subsidiaries	-.0685149	-.0670968	.7882234	.8042464
Independent	-.0479239	-.0422682	.8690824	.8666482
PORT#				
TFP2015				
No ports wit~m	-.4417264	-.1915831	.721933	.7759205
RD2015#				
logemp2015				
0	.3430699	.0497237	1.09516	.8355673
1	.279322	-.007958	2.241945	.9200771
TECH#				
logemp2015				
Low-tech ind~s	.4369485	.1279443	1.564439	.9359744
Medium low-t~s	.2220945	.0127025	1.885235	.877024
Medium high-~s	.1143781	-.0708791	1.40399	.8483801
OWN#				
logemp2015				
Listed compa~s	-.0674125	.0137523	.9761556	1.324271
Subsidiaries	.1203638	-.0230482	1.446184	.941001
Independent	.2905823	.062425	1.467907	.8834197
PORT#				
logemp2015				
No ports wit~m	.1209781	.000766	1.265713	.7972542
RD2015#				
DEBTS2015				
0	-.1864271	-.0198333	.9996046	1.010142
1	.172633	-.044448	1.67456	.882014
TECH#				
DEBTS2015				
Low-tech ind~s	.3240602	.1653436	1.397792	1.0189
Medium low-t~s	.0861941	.0303239	1.270391	1.09737
Medium high-~s	-.1882016	-.1297783	.7387153	.9417298
OWN#				
DEBTS2015				
Listed compa~s	-.2168937	-.0919439	.3931825	.7258776
Subsidiaries	-.0770155	-.065614	.7977173	.8817391
Independent	-.0187904	.1079514	.91535	1.025226
PORT#				
DEBTS2015				
No ports wit~m	-.3623245	-.0681125	.8590716	.9202296
RD2015#				
EXP2015				
0	.5830292	.1217003	1.928235	1.794025
1	.3477905	.0040827	3.523421	1.1739
TECH#				
EXP2015				

Low-tech ind~s	.8565593	.2705411	4.838166	1.546671
Medium low-t~s	.3502471	.0849604	4.551188	1.443943
Medium high-~s	.1785053	-.0310256	2.475071	1.399791
OWN# EXP2015				
Listed compa~s	-.136976	-.0504486	.8950948	1.189453
Subsidiaries	.2016703	.0311144	2.156128	1.421607
Independent	.436904	.1000402	2.599661	1.357374
PORT# EXP2015				
No ports wit~m	.0633112	-.0673596	1.859519	1.169326

Table 17 – Model 12 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Exports-orien~I				
RD2015#				
logwages2015				
0	-.0543778	-.0315829	.8314175	1.024765
1	-.1950359	.0127265	.4525853	.9863704
TECH#				
logwages2015				
Low-tech ind~s	.4736398	.0443189	1.496532	.9892241
Medium low-t~s	.0664699	.0031922	1.169691	1.011107
Medium high-~s	-.2589629	.0341528	.6641191	1.126057
OWN#				
logwages2015				
Listed compa~s	-.2778909	-.0281693	.2713008	.7943697
Subsidiaries	-.0247735	-.0422955	.8991979	.901698
Independent	-.0116091	.0201395	.9116825	1.079464
PORT#				
logwages2015				
No ports wit~m	-.4547744	-.0868667	.8433023	1.024276
RD2015#				
TFP2015				
0	-.1359684	-.037454	.8918291	.918461
1	-.1259378	.0472036	.65096	1.107695
TECH#				
TFP2015				
Low-tech ind~s	.4373002	.0321365	1.533791	.9386616
Medium low-t~s	.0067488	.0040568	.9620104	1.021275
Medium high-~s	-.3024457	.016949	.5726707	.980011
OWN#				
TFP2015				
Listed compa~s	-.2675542	.008067	.2609371	.9891675
Subsidiaries	-.0365281	-.0249024	.8707441	.9210027
Independent	-.0162011	.0081176	.9447659	.9746869
PORT#				
TFP2015				
No ports wit~m	-.4899853	-.0792977	.720844	.9107853
RD2015#				
logemp2015				
0	.5365916	.0873882	.8923508	.7946744
1	-.0721297	.0510471	.7643856	1.146814
TECH#				
logemp2015				
Low-tech ind~s	.488208	.0501284	1.421474	.9290898
Medium low-t~s	.2052944	.0197241	1.938082	.9564219
Medium high-~s	.0709839	.0452116	1.353146	.9399119
OWN#				
logemp2015				
Listed compa~s	-.1214795	.0541965	.7275493	1.268373
Subsidiaries	.1781858	.024501	1.492204	.9714906
Independent	.2618853	.0396343	1.386229	.9249252
PORT#				
logemp2015				
No ports wit~m	.0914965	.0287405	1.278882	.9378869
RD2015#				
DEBTS2015				
0	.001226	.0216109	.995476	1.002892
1	-.1641255	.0022893	.4850139	.879476
TECH#				
DEBTS2015				
Low-tech ind~s	.3945026	.0459649	1.515702	1.025281
Medium low-t~s	.0167955	-.0037384	.9695659	.9342798
Medium high-~s	-.221687	.0377533	.6856474	1.069942
OWN#				
DEBTS2015				
Listed compa~s	-.2598745	.0023192	.291151	.9985444
Subsidiaries	-.0087033	.0096169	.951319	1.040902
Independent	-.0019992	.0412497	.9955815	1.068285
PORT#				
DEBTS2015				
No ports wit~m	-.3814796	-.0444673	.8473756	.9797935
Technology in~I				
RD2015#				
logwages2015				
0	-.0538249	.0479631	.903897	1.219628
1	-.1073407	-.0163243	.6673931	.9183453

TECH#				
logwages2015				
Low-tech ind~s	.4027965	.0463112	1.434761	.9791975
Medium low-t~s	.0975446	.0145034	1.160536	.9727601
Medium high-~s	-.1673556	-.0260581	.8574736	1.04763
OWN#				
logwages2015				
Listed compa~s	-.2169353	-.0947546	.3922687	.6119219
Subsidiaries	-.0425443	-.02574	.9203538	.9875803
Independent	-.036014	.0741431	.9076485	1.291195
PORT#				
logwages2015				
No ports wit~m	-.3454685	.0039071	.9149125	1.229664
RD2015#				
TFP2015				
0	-.1313927	.0013804	.8540626	.9296503
1	-.1012239	-.0065255	.6889331	1.093503
TECH#				
TFP2015				
Low-tech ind~s	.3694973	.034474	1.489701	.9709421
Medium low-t~s	.0518822	.0078002	1.001561	.9165028
Medium high-~s	-.2495566	-.0447848	.6189087	.864556
OWN#				
TFP2015				
Listed compa~s	-.2815968	-.1347448	.2019465	.4081194
Subsidiaries	-.0556621	-.00813	.8592484	1.043553
Independent	-.0672592	.0464658	.8369246	1.076244
PORT#				
TFP2015				
No ports wit~m	-.4012811	-.0446107	.7255536	.9425727
RD2015#				
logemp2015				
0	.5481778	.0994287	.9314801	.7280735
1	.0347554	.0265138	1.252951	1.088882
TECH#				
logemp2015				
Low-tech ind~s	.4680492	.0542998	1.579465	.9391623
Medium low-t~s	.2493748	.0239951	2.009827	.8884071
Medium high-~s	.0986493	.0152511	1.365324	.9175772
OWN#				
logemp2015				
Listed compa~s	-.0762962	-.0316553	.9073743	.8876627
Subsidiaries	.1521653	.0210007	1.541452	.9992112
Independent	.242143	.0684161	1.350407	.876301
PORT#				
logemp2015				
No ports wit~m	.1864102	.0611267	1.271943	.8733076
RD2015#				
DEBTS2015				
0	.0082779	-.0387567	1.061126	1.028017
1	-.0624783	-.0082343	.8300401	.9807015
TECH#				
DEBTS2015				
Low-tech ind~s	.3707233	.0463029	1.539417	1.008367
Medium low-t~s	.1156188	.0152267	1.324929	.9899301
Medium high-~s	-.1882066	-.0369414	.7907742	1.00995
OWN#				
DEBTS2015				
Listed compa~s	-.2425736	-.1025759	.3211729	.6027879

Subsidiaries	-.0324786	-.029173	.9393961	.9561493
Independent	-.0549595	-.0345385	.9269303	.9246959
PORT# DEBTS2015				
No ports wit~m	-.2571079	-.078153	.9877639	1.002015
Domestic mark~I				
RD2015# logwages2015				
0	-.2078325	-.0065802	1.011215	1.06576
1	.16543	.0292123	1.466965	1.102179
TECH# logwages2015				
Low-tech ind~s	.3894415	.0613799	1.450463	.9945
Medium low-t~s	.0929471	.0143425	1.181631	1.00078
Medium high-~s	-.1705297	-.0253085	.8183223	1.015762
OWN# logwages2015				
Listed compa~s	-.2160366	-.0166439	.4310743	1.095457
Subsidiaries	-.0629426	.0127119	.8380721	1.059936
Independent	.0365165	.0156232	1.000944	1.027084
PORT# logwages2015				
No ports wit~m	-.3665189	-.0398557	.9366235	1.067074
RD2015# TFP2015				
0	-.2377521	-.0453081	.932515	.9057154
1	.159953	.0408264	1.388941	1.130653
TECH# TFP2015				
Low-tech ind~s	.3649215	.0555407	1.506329	.996996
Medium low-t~s	.0690127	.0137654	1.10837	.9928369
Medium high-~s	-.2294536	-.0451198	.6496768	.8570668
OWN# TFP2015				
Listed compa~s	-.236995	-.03735	.3382036	.8899814
Subsidiaries	-.0682735	-.0100032	.7885738	.8528066
Independent	-.0475683	.0064809	.8693651	.9875933
PORT# TFP2015				
No ports wit~m	-.4415523	-.0659991	.721871	.9019687
RD2015# logemp2015				
0	.3432498	.0706688	1.095504	.8095892
1	.2798129	.032291	2.238527	1.007666
TECH# logemp2015				
Low-tech ind~s	.4372167	.0532376	1.565096	.9527437
Medium low-t~s	.2222447	.0164207	1.88618	.8943725
Medium high-~s	.1146375	.0123016	1.404565	.9237145
OWN# logemp2015				
Listed compa~s	-.067501	.0131409	.9721378	1.185853
Subsidiaries	.1205808	.0140261	1.446838	.9531191
Independent	.2908731	.0427689	1.468471	.9285224
PORT# logemp2015				
No ports wit~m	.1216685	.0437578	1.264655	.906829
RD2015# DEBTS2015				
0	-.1866275	-.0159714	.9993153	.9800101
1	.1719033	.0060005	1.669132	.9961952
TECH# DEBTS2015				
Low-tech ind~s	.3243259	.0490847	1.398383	.9797082
Medium low-t~s	.0863662	.0179892	1.271015	1.055374
Medium high-~s	-.1878949	-.0286052	.7389934	.9605723
OWN# DEBTS2015				
Listed compa~s	-.2190605	-.0643581	.3886477	.7394754
Subsidiaries	-.0767565	.0010364	.798059	.9643688
Independent	-.0185005	.0126027	.9157138	.9650563
PORT# DEBTS2015				
No ports wit~m	-.3622134	-.0594268	.8588597	.9760627

Table 17 – Model 13 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Exports-orien~I				
RD2015#				
logwages2015				
0	-.0543778	-.0427407	.8314175	1.015568
1	-.1950359	.0335516	.4525853	1.059644
TECH#				
logwages2015				
Low-tech ind~s	.4736398	.0241433	1.496532	.9722296
Medium low-t~s	.0664699	-.0057257	1.169691	.9991922
Medium high-~s	-.2589629	.0248593	.6641191	1.094691
OWN#				
logwages2015				
Listed compa~s	-.2778909	-.0060288	.2713008	.8438418
Subsidiaries	-.0247735	-.0422045	.8991979	.9035583
Independent	-.0116091	.0145083	.9116825	1.071879
RD2015#				
TFP2015				
0	-.1359684	-.0258079	.8918291	.95842
1	-.1259378	.0597113	.65096	1.129136
TECH#				
TFP2015				
Low-tech ind~s	.4373002	.0175981	1.533791	.9412734
Medium low-t~s	.0067488	-.0041513	.9620104	1.011702
Medium high-~s	-.3024457	.0130599	.5726707	.9938416
OWN#				
TFP2015				
Listed compa~s	-.2675542	.0518431	.2609371	1.214037
Subsidiaries	-.0365281	-.0182743	.8707441	.9698304
Independent	-.0162011	.0046	.9447659	.9886893
RD2015#				
logemp2015				
0	.5365916	.0741606	.8923508	.7758566
1	-.0721297	.0533508	.7643856	1.166167
TECH#				
logemp2015				
Low-tech ind~s	.488208	.0310229	1.421474	.9021348
Medium low-t~s	.2052944	.0074127	1.938082	.9176494
Medium high-~s	.0709839	.0285138	1.353146	.9175385
OWN#				
logemp2015				
Listed compa~s	-.1214795	.0892105	.7275493	1.436523
Subsidiaries	.1781858	.0200439	1.492204	.9546867
Independent	.2618853	.0243009	1.386229	.9034998
RD2015#				

DEBTS2015				
0	.001226	.0300965	.995476	1.024068
1	-.1641255	.026715	.4850139	.9563355
TECH# DEBTS2015				
Low-tech ind~s	.3945026	.0313785	1.515702	1.008758
Medium low-t~s	.0167955	-.0156854	.9695659	.8989278
Medium high-~s	-.221687	.0292651	.6856474	1.047138
OWN# DEBTS2015				
Listed compa~s	-.2598745	.0410825	.291151	1.211529
Subsidiaries	-.0087033	.0086008	.951319	1.043851
Independent	-.0019992	.0380743	.9955815	1.054065
Technology in~I				
RD2015# logwages2015				
0	-.0538249	.0392174	.903897	1.181296
1	-.1073407	-.0151876	.6673931	.917741
TECH# logwages2015				
Low-tech ind~s	.4027965	.0470515	1.434761	.981375
Medium low-t~s	.0975446	.0133433	1.160536	.9665633
Medium high-~s	-.1673556	-.0206795	.8574736	1.052047
OWN# logwages2015				
Listed compa~s	-.2169353	-.0887423	.3922687	.632671
Subsidiaries	-.0425443	-.0213199	.9203538	.9909241
Independent	-.036014	.0500809	.9076485	1.221833
RD2015# TFP2015				
0	-.1313927	-.0006937	.8540626	.927813
1	-.1012239	-.0056526	.6889331	1.104741
TECH# TFP2015				
Low-tech ind~s	.3694973	.0392814	1.489701	.9844442
Medium low-t~s	.0518822	.0060499	1.001561	.9128739
Medium high-~s	-.2495566	-.0373774	.6189087	.8899319
OWN# TFP2015				
Listed compa~s	-.2815968	-.1304724	.2019465	.4192716
Subsidiaries	-.0556621	.001106	.8592484	1.090771
Independent	-.0672592	.0283724	.8369246	1.042001
RD2015# logemp2015				
0	.5481778	.0941327	.9314801	.7284666
1	.0347554	.0278461	1.252951	1.089624
TECH# logemp2015				
Low-tech ind~s	.4680492	.0498927	1.579465	.9265101
Medium low-t~s	.2493748	.0210556	2.009827	.8772521
Medium high-~s	.0986493	.0178875	1.365324	.9247214
OWN# logemp2015				
Listed compa~s	-.0762962	-.0282091	.9073743	.8918505
Subsidiaries	.1521653	.0240913	1.541452	1.003157
Independent	.242143	.055909	1.350407	.8683339
RD2015# DEBTS2015				
0	.0082779	-.0235193	1.061126	1.039887
1	-.0624783	-.0076769	.8300401	.9864149

TECH#				
DEBTS2015				
Low-tech ind~s	.3707233	.0485921	1.539417	1.011867
Medium low-t~s	.1156188	.0162356	1.324929	.9978308
Medium high-~s	-.1882066	-.0300983	.7907742	1.022589
OWN#				
DEBTS2015				
Listed compa~s	-.2425736	-.0947374	.3211729	.6347128
Subsidiaries	-.0324786	-.0244319	.9393961	.965303
Independent	-.0549595	-.0373314	.9269303	.9268059
Domestic mark~I				
RD2015#				
logwages2015				
0	-.2078325	.0076656	1.011215	1.058757
1	.16543	.0228996	1.466965	1.115097
TECH#				
logwages2015				
Low-tech ind~s	.3894415	.0394572	1.450463	.9737378
Medium low-t~s	.0929471	.0049601	1.181631	.9714965
Medium high-~s	-.1705297	-.0244623	.8183223	1.028968
OWN#				
logwages2015				
Listed compa~s	-.2160366	-.0115877	.4310743	1.147882
Subsidiaries	-.0629426	.006729	.8380721	1.060856
Independent	.0365165	.0039741	1.000944	1.021588
RD2015#				
TFP2015				
0	-.2377521	-.0120263	.932515	.9650474
1	.159953	.0218878	1.388941	1.044156
TECH#				
TFP2015				
Low-tech ind~s	.3649215	.0327309	1.506329	.9859714
Medium low-t~s	.0690127	.006004	1.10837	.9749854
Medium high-~s	-.2294536	-.0382592	.6496768	.9019918
OWN#				
TFP2015				
Listed compa~s	-.236995	-.0469272	.3382036	.8173917
Subsidiaries	-.0682735	-.0133201	.7885738	.8760168
Independent	-.0475683	.0023218	.8693651	1.000372
RD2015#				
logemp2015				
0	.3432498	.0643563	1.095504	.8009073
1	.2798129	.019951	2.238527	.9786301
TECH#				
logemp2015				
Low-tech ind~s	.4372167	.0310458	1.565096	.929855
Medium low-t~s	.2222447	.0064366	1.88618	.8682501
Medium high-~s	.1146375	.0011562	1.404565	.912184
OWN#				
logemp2015				
Listed compa~s	-.067501	.0055157	.9721378	1.153009
Subsidiaries	.1205808	.0049847	1.446838	.9442848
Independent	.2908731	.0313627	1.468471	.9202045
RD2015#				
DEBTS2015				
0	-.1866275	.0156688	.9993153	1.006611
1	.1719033	.0010992	1.669132	.9913071
TECH#				
DEBTS2015				
Low-tech ind~s	.3243259	.0314808	1.398383	.9656446
Medium low-t~s	.0863662	.0116974	1.271015	1.037317
Medium high-~s	-.1878949	-.0260277	.7389934	.9761535
OWN#				
DEBTS2015				
Listed compa~s	-.2190605	-.0592992	.3886477	.7671304
Subsidiaries	-.0767565	-.0088082	.798059	.9447382
Independent	-.0185005	.0129846	.9157138	.969625

Table 17 – Model 14 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Exports-orien~I				
RD2015#				
logwages2015				
0	-.0543778	.1192022	.8314175	.9655377
1	-.1950359	-.0925605	.4525853	.7411468
OWN#				
logwages2015				
Listed compa~s	-.2778909	-.0480477	.2713008	.9003521
Subsidiaries	-.0247735	-.0056363	.8991979	1.080166
Independent	-.0116091	.0968953	.9116825	1.082678
PORT#				
logwages2015				
No ports wit~m	-.4547744	.1199079	.8433023	1.029599
RD2015#				
TFP2015				
0	-.1359684	.0113406	.8918291	.8624004
1	-.1259378	-.049086	.65096	.8467075
OWN#				
TFP2015				
Listed compa~s	-.2675542	-.0894796	.2609371	.5781779
Subsidiaries	-.0365281	-.0279306	.8707441	.9581144
Independent	-.0162011	.079925	.9447659	.9990345
PORT#				
TFP2015				
No ports wit~m	-.4899853	.057744	.720844	.9193218
RD2015#				
logemp2015				
0	.5365916	.0100712	.8923508	.8716294
1	-.0721297	-.0413809	.7643856	.8630751
OWN#				
logemp2015				
Listed compa~s	-.1214795	-.0184486	.7275493	1.001908
Subsidiaries	.1781858	.004846	1.492204	.9542206
Independent	.2618853	-.0098497	1.386229	.9207732
PORT#				
logemp2015				
No ports wit~m	.0914965	.0074545	1.278882	.9332896
RD2015#				
DEBTS2015				
0	.001226	.024674	.995476	1.033455
1	-.1641255	-.1146967	.4850139	.5968424
OWN#				
DEBTS2015				
Listed compa~s	-.2598745	-.0598304	.291151	.766162
Subsidiaries	-.0087033	-.026889	.951319	.9465205
Independent	-.0019992	.058876	.9955815	1.167307
PORT#				

DEBTS2015				
No ports wit~m	-.3814796	.0354504	.8473756	1.056796
RD2015#				
EXP2015				
0	.8763157	.0004835	1.245292	.9554551
1	-.00679	-.039261	1.543698	1.020971
OWN#				
EXP2015				
Listed compa~s	-.1931229	-.0264712	.6872543	1.081997
Subsidiaries	.2561676	-.007782	2.234584	.9640206
Independent	.399084	.0060459	2.313719	.9357236
PORT#				
EXP2015				
No ports wit~m	.0006763	.032852	1.764953	1.143255
Technology in~I				
RD2015#				
logwages2015				
0	-.0538249	-.0163067	.903897	.9397787
1	-.1073407	-.0110775	.6673931	.9490248
OWN#				
logwages2015				
Listed compa~s	-.2169353	-.0145993	.3922687	.848705
Subsidiaries	-.0425443	-.0358073	.9203538	.975909
Independent	-.036014	-.0184573	.9076485	.9184011
PORT#				
logwages2015				
No ports wit~m	-.3454685	.0062256	.9149125	.9448088
RD2015#				
TFP2015				
0	-.1313927	-.0520085	.8540626	.8456116
1	-.1012239	-.0177922	.6889331	.9689329
OWN#				
TFP2015				
Listed compa~s	-.2815968	-.0253088	.2019465	.7780719
Subsidiaries	-.0556621	-.0426652	.8592484	.9061934
Independent	-.0672592	-.027979	.8369246	.8909956
PORT#				
TFP2015				
No ports wit~m	-.4012811	-.0358156	.7255536	.8335468
RD2015#				
logemp2015				
0	.5481778	.0818702	.9314801	.7685661
1	.0347554	.0156305	1.252951	1.079821
OWN#				
logemp2015				
Listed compa~s	-.0762962	.0415912	.9073743	1.16546
Subsidiaries	.1521653	.0065252	1.541452	.9912796
Independent	.242143	.0581338	1.350407	.9109951
PORT#				
logemp2015				
No ports wit~m	.1864102	.0770234	1.271943	.8634204
RD2015#				
DEBTS2015				
0	.0082779	-.0056919	1.061126	1.031835
1	-.0624783	.0252725	.8300401	1.122676
OWN#				
DEBTS2015				
Listed compa~s	-.2425736	-.0097921	.3211729	.9701184

Subsidiaries	-.0324786	-.050679	.9393961	.9068504
Independent	-.0549595	.0093186	.9269303	1.00621
PORT# DEBTS2015				
No ports wit~m	-.2571079	.0393491	.9877639	1.072057
RD2015# EXP2015				
0	.7701449	.0304513	1.447739	.9548641
1	.0584054	-.0093716	1.720453	.9852083
OWN# EXP2015				
Listed compa~s	-.1596489	-.0006692	.775527	1.073436
Subsidiaries	.2012573	-.016879	2.140221	.9956393
Independent	.3348252	.0197181	2.179679	.9352476
PORT# EXP2015				
No ports wit~m	.0950867	.0494186	1.777468	1.092808
Domestic mark~I				
RD2015# logwages2015				
0	-.2078325	-.0503075	1.011215	1.000575
1	.16543	.0517749	1.466965	1.197363
OWN# logwages2015				
Listed compa~s	-.2160366	-.0976002	.4310743	.6698554
Subsidiaries	-.0629426	-.0408793	.8380721	.8693907
Independent	.0365165	.068949	1.000944	1.069061
PORT# logwages2015				
No ports wit~m	-.3665189	.073179	.9366235	.9881792
RD2015# TFP2015				
0	-.2377521	-.0315701	.932515	.9492882
1	.159953	.0873672	1.388941	1.406494
OWN# TFP2015				
Listed compa~s	-.236995	-.0555249	.3382036	.9709291
Subsidiaries	-.0682735	.0089558	.7885738	.9293365
Independent	-.0475683	.0539226	.8693651	1.046748
PORT# TFP2015				
No ports wit~m	-.4415523	.1087752	.721871	1.037904
RD2015# logemp2015				
0	.3432498	-.0129087	1.095504	.8186628
1	.2798129	.0093681	2.238527	1.045062
OWN# logemp2015				
Listed compa~s	-.067501	-.0186162	.9721378	.9901679
Subsidiaries	.1205808	-.0029342	1.446838	.9485905
Independent	.2908731	-.0024232	1.468471	.9018724
PORT# logemp2015				
No ports wit~m	.1216685	.0363362	1.264655	.8522624
RD2015# DEBTS2015				
0	-.1866275	-.0157454	.9993153	1.011164
1	.1719033	.0262579	1.669132	1.050465

OWN#				
DEBTS2015				
Listed compa~s	-.2190605	-.0848078	.3886477	.7120309
Subsidiaries	-.0767565	.0054435	.798059	1.024654
Independent	-.0185005	.0556363	.9157138	1.008612
PORT#				
DEBTS2015				
No ports wit~m	-.3622134	.0768677	.8588597	1.030316
RD2015#				
EXP2015				
0	.582716	-.0656447	1.926808	1.045295
1	.3475103	.0253159	3.520592	1.011641
OWN#				
EXP2015				
Listed compa~s	-.138373	-.0589798	.8916974	.9671701
Subsidiaries	.2018938	-.0102139	2.157032	.9385187
Independent	.4371909	-.0059829	2.600467	.9203896
PORT#				
EXP2015				
No ports wit~m	.0635738	.0396451	1.85949	1.063968

Table 17 – Model 15 Balance

	Standardized differences		Variance ratio	
	Raw	Weighted	Raw	Weighted
Exports-orien~I				
RD2015#				
logwages2015				
0	-.0543778	-.0243303	.8314175	1.024713
1	-.1950359	.0076753	.4525853	.9698578
TECH#				
logwages2015				
Low-tech ind~s	.4736398	.0436227	1.496532	.9716893
Medium low-t~s	.0664699	.0112001	1.169691	1.04453
Medium high-~s	-.2589629	.0364197	.6641191	1.13201
PORT#				
logwages2015				
No ports wit~m	-.4547744	-.0848787	.8433023	1.032533
RD2015#				
TFP2015				
0	-.1359684	-.0333206	.8918291	.909423
1	-.1259378	.043999	.65096	1.112453
TECH#				
TFP2015				
Low-tech ind~s	.4373002	.041305	1.533791	.9527754
Medium low-t~s	.0067488	.0070338	.9620104	1.018133
Medium high-~s	-.3024457	.0190724	.5726707	.983656
PORT#				
TFP2015				
No ports wit~m	-.4899853	-.0787591	.720844	.9114192
RD2015#				
logemp2015				
0	.5365916	.0813821	.8923508	.789826
1	-.0721297	.0530149	.7643856	1.181828
TECH#				
logemp2015				
Low-tech ind~s	.488208	.0503672	1.421474	.9225429
Medium low-t~s	.2052944	.0206925	1.938082	.965279
Medium high-~s	.0709839	.0444115	1.353146	.9384234
PORT#				
logemp2015				
No ports wit~m	.0914965	.0266459	1.278882	.9447181
RD2015#				
DEBTS2015				
0	.001226	.0258188	.995476	1.044401
1	-.1641255	-.0005344	.4850139	.8853943
TECH#				
DEBTS2015				

Low-tech ind~s	.3945026	.0510192	1.515702	1.047561
Medium low-t~s	.0167955	-.0006007	.9695659	.9524455
Medium high-~s	-.221687	.0369004	.6856474	1.099309
PORT# DEBTS2015				
No ports wit~m	-.3814796	-.0470141	.8473756	1.010001
Technology in~I				
RD2015# logwages2015				
0	-.0538249	.0445359	.903897	1.216701
1	-.1073407	-.0098187	.6673931	.9344017
TECH# logwages2015				
Low-tech ind~s	.4027965	.0318882	1.434761	.9712831
Medium low-t~s	.0975446	.004172	1.160536	.950309
Medium high-~s	-.1673556	-.0272154	.8574736	1.043065
PORT# logwages2015				
No ports wit~m	-.3454685	.0026522	.9149125	1.214487
RD2015# TFP2015				
0	-.1313927	.0047981	.8540626	.916102
1	-.1012239	.0109919	.6889331	1.215223
TECH# TFP2015				
Low-tech ind~s	.3694973	.0226494	1.489701	.958662
Medium low-t~s	.0518822	.0016735	1.001561	.9012015
Medium high-~s	-.2495566	-.039643	.6189087	.8687879
PORT# TFP2015				
No ports wit~m	-.4012811	-.0340464	.7255536	.9354667
RD2015# logemp2015				
0	.5481778	.0922959	.9314801	.7306855
1	.0347554	.0329072	1.252951	1.125749
TECH# logemp2015				
Low-tech ind~s	.4680492	.0359231	1.579465	.9247973
Medium low-t~s	.2493748	.0195921	2.009827	.8856831
Medium high-~s	.0986493	.0120975	1.365324	.9129863
PORT# logemp2015				
No ports wit~m	.1864102	.0606417	1.271943	.8734677
RD2015# DEBTS2015				
0	.0082779	-.0331046	1.061126	1.098955
1	-.0624783	-.0014718	.8300401	1.031709
TECH# DEBTS2015				
Low-tech ind~s	.3707233	.031098	1.539417	1.029271
Medium low-t~s	.1156188	.0068668	1.324929	.9940731
Medium high-~s	-.1882066	-.0346318	.7907742	1.049581
PORT# DEBTS2015				
No ports wit~m	-.2571079	-.0653962	.9877639	1.057608
Domestic mark~I				
RD2015# logwages2015				

0	-.2078325	-.0079631	1.011215	1.051497
1	.16543	.0162467	1.466965	1.056082
TECH# logwages2015				
Low-tech ind~s	.3894415	.0568298	1.450463	.9963683
Medium low-t~s	.0929471	.013798	1.181631	1.007066
Medium high-~s	-.1705297	-.0274166	.8183223	1.004853
PORT# logwages2015				
No ports wit~m	-.3665189	-.0582712	.9366235	1.051084
RD2015# TFP2015				
0	-.2377521	-.0252005	.932515	.9146955
1	.159953	.0275938	1.388941	1.07007
TECH# TFP2015				
Low-tech ind~s	.3649215	.05638	1.506329	1.001571
Medium low-t~s	.0690127	.0115904	1.10837	.9717645
Medium high-~s	-.2294536	-.0363516	.6496768	.8818756
PORT# TFP2015				
No ports wit~m	-.4415523	-.0720612	.721871	.8862241
RD2015# logemp2015				
0	.3432498	.0761677	1.095504	.7989931
1	.2798129	.030072	2.238527	1.006807
TECH# logemp2015				
Low-tech ind~s	.4372167	.0479157	1.565096	.9450889
Medium low-t~s	.2222447	.0186335	1.88618	.9078105
Medium high-~s	.1146375	.0188572	1.404565	.9308547
PORT# logemp2015				
No ports wit~m	.1216685	.039913	1.264655	.9092871
RD2015# DEBTS2015				
0	-.1866275	.002122	.9993153	1.043015
1	.1719033	.000696	1.669132	1.004653
TECH# DEBTS2015				
Low-tech ind~s	.3243259	.0501415	1.398383	1.00866
Medium low-t~s	.0863662	.0138303	1.271015	1.063429
Medium high-~s	-.1878949	-.0235113	.7389934	1.003717
PORT# DEBTS2015				
No ports wit~m	-.3622134	-.0631358	.8588597	1.014666