Statistics/Data Analysis

```
      name:  <unnamed>
       log:  C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconom
> etrics\fdimatching_clean\03_log\03a_PSM.smcl
  log type:  smcl
 opened on:  30 Mar 2020, 09:25:18

1 .
2 .                         do $scripts\03a_PSM

3 . /*******************************************************************************
  >                                                                        PSM DO-FILE
  > *******************************************************************************
  >
  >                         Applied Microeconometrics
  >
  >                                       Empirical Project
  >
  >                                                   Do-File 03a
  >
  >                 PURPOSE:        Perform Propensity Score Matching
  >                                         Effect of FDI on TFP
  >
  >                 OUTLINE:        PART 1: Complete Model
  >                                         PART 2: Improved Model (w/o TECH)
  >
  >
  >
  > *******************************************************************************
  >                                       PART 1: Complete Model
  > *******************************************************************************/
4 .
5 . //      Setting globals for interaction terms
6 .         global F "OWN TECH PORT"        // Dummies with TECH

7 .         global C "logwages2015 TFP2015 logemp2015 DEBTS2015 EXP2015 RD2015"

8 .
9 . *-------------------------------------------------------------------------------*
10. *       PART 1.1: No interactions
11. *-------------------------------------------------------------------------------*
12.
13. *========*
14. * Logit
15. *========*
16.
17. *       ATE:
18. *       ----
19.         cap drop osa1

20.         cap drop p1

21.         teffects psmatch (TFP2017) ///
  >                                       (FDI2016 i.OWN i.TECH PORT ///
  >                                        logwages2015 TFP2015 logemp2015 DEBTS2015
  > EXP2015 RD2015),    ///
  >                                        osample(osa1) generate(p1)

Treatment-effects estimation                   Number of obs      =     11,323
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                  min =          1
Treatment model: logit                                     max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
ATE						
FDI2016 (1 vs 0)	**.8577745**	**.1618426**	**5.30**	**0.000**	**.5405688**	**1.17498**

```
22.         // Significant ATE
23.
24.         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_log_comp1.gph, re
  > place)
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_log_comp1.gph saved)

25.         graph export $results\03a_PSM\overl_log_comp1.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_log_comp1.pdf written in PDF format)

26.         // Really bad overlap
27.
28.         tebalance summarize

    Covariate balance summary
                                                      Raw              Matched
    ------------------------------------------------------------------------
    Number of obs =                             11,323               22,646
    Treated obs   =                              4,460               11,323
    Control obs   =                              6,863               11,323
    ------------------------------------------------------------------------

    ------------------------------------------------------------------------
                        |  Standardized differences          Variance ratio
                        |        Raw     Matched              Raw     Matched
    --------------------+---------------------------------------------------
                    OWN |
      Subsidiaries      |   -.018354    -.088095       .9769702    .858366
       Independent      |   .0616272   -.0365731        1.02321   .9742405
             State      |   .1016402   -.4001546       1.100951   .7088027
                        |
                   TECH |
    Medium low-t~s      |   .1206088   -.0152956       1.263082   .9634731
    Medium high-~s      |  -.2329159   -.1939862       .8156583   .7717778
    High-tech in~s      |  -.5425507    .4301909       .2855456   1.693899
                        |
                   PORT |   .4092869   -.3412843       1.253595   .8230184
       logwages2015     |  -.1300321   -.0515036       .9769191   .8845742
            TFP2015     |   -.178877    .2139231       .9473458   .4003003
          logemp2015    |   .5654306    -.156559        .803081   .6229867
           DEBTS2015    |  -.0529435   -.2515877       1.051101   1.021671
             EXP2015    |   1.014184    .5934387       1.228659   1.336483
              RD2015    |   .0356507   -.0076941       1.085768   .9795245
    ------------------------------------------------------------------------

29.         // SD catastrophy. VR not good either.
30.
31.
32. *========*
33. * Probit
34. *========*
35. *       ATE:
36. *       ----
37.         cap drop osa1

38.         cap drop p1

39.         cap teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.OWN i.TECH PORT ///
  >                                       logwages2015 TFP2015 logemp2015 DEBTS2015
  > EXP2015 RD2015, probit),    ///
  >                                       osample(osa1) generate(p1)
```

```
40.                                     // violation of overlap assumption for 389 obs
  >
41.
42.         // Reestimate
43.         teffects psmatch (TFP2017) ///
  >                                          (FDI2016 i.OWN i.TECH PORT ///
  >                                           logwages2015 TFP2015 logemp2015 DEBTS2015
  > EXP2015 RD2015, probit)     ///
  >                                           if osa1 == 0
```

Treatment-effects estimation — Number of obs = **10,934**
Estimator : **propensity-score matching** — Matches: requested = **1**
Outcome model : **matching** — min = **1**
Treatment model: **probit** — max = **1**

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.9488443**	**.1628937**	**5.82**	**0.000**	**.6295785**	**1.26811**

```
44.
45.         tebalance summarize
note: refitting the model using the generate() option
```

Covariate balance summary

	Raw	Matched
Number of obs =	**10,934**	**21,868**
Treated obs =	**4,452**	**10,934**
Control obs =	**6,482**	**10,934**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.0212146**	**-.0635535**	**.973424**	**.8969059**
Independent	**.0488324**	**-.0169904**	**1.017587**	**.9885831**
State	**.0914264**	**-.4138967**	**1.089173**	**.7069191**
TECH				
Medium low-t~s	**.0991524**	**-.0073588**	**1.20641**	**.9827697**
Medium high-~s	**-.2478209**	**-.1704468**	**.8090465**	**.7994692**
High-tech in~s	**-.4694338**	**.4340129**	**.3150794**	**1.824106**
PORT	**.3788672**	**-.3550222**	**1.219769**	**.8277367**
logwages2015	**-.1173309**	**-.0589268**	**.9807975**	**.874688**
TFP2015	**-.1633338**	**.2570269**	**.9433807**	**.4128085**
logemp2015	**.5228527**	**-.1831482**	**.8075973**	**.6516886**
DEBTS2015	**-.0462174**	**-.2362799**	**1.045127**	**1.032433**
EXP2015	**.9897433**	**.5465259**	**1.197448**	**1.417926**
RD2015	**.033838**	**-.0171273**	**1.081185**	**.9538874**

```
46.         // SD catastrophy. VR not good either.
47.
```

```
48.         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_prob_comp1.gph, r
  > eplace)
  note: refitting the model using the generate() option
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_comp1.gph saved)

49.         graph export $results\03a_PSM\overl_prob_comp1.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_comp1.pdf written in PDF format)

50.         // Really bad overlap
51.
52.
53. *-------------------------------------------------------------------------------*
54. *       PART 1.2: Interacting dummies
55. *-------------------------------------------------------------------------------*
56. /*      From now on only probit, bc. no large differences and previous pscore
  >         estimations consistently gave higher R2.
  >                           */
57.
58. *       ATE:
59. *       ----
60.         cap drop osa1

61.         cap drop p1

62.         cap teffects psmatch (TFP2017) ///
  >                                       (FDI2016 i.($F)##i.($F) $C, probit),   ///
  >                                        osample(osa1) generate(p1)

63.                                    // violation of overlap assumption for 415 obs
  >
64.
65.         // Reestimate
66.         teffects psmatch (TFP2017) ///
  >                                       (FDI2016 i.($F)##i.($F) $C, probit)    ///
  >                                      if osa1 == 0
```

Treatment-effects estimation — Number of obs = **10,908**
Estimator : **propensity-score matching** — Matches: requested = **1**
Outcome model : **matching** — min = **1**
Treatment model: **probit** — max = **1**

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.3140097**	**.4709414**	**0.67**	**0.505**	**-.6090184**	**1.237038**

```
67.
68.         tebalance summarize
  note: refitting the model using the generate() option
```

Covariate balance summary

	Raw	Matched
Number of obs =	**10,908**	**21,816**
Treated obs =	**4,454**	**10,908**
Control obs =	**6,454**	**10,908**

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
OWN				
Subsidiaries	-.0136343	-.4030042	.9827099	.6479174
Independent	.0453548	.0077473	1.016157	1.00529
State	.087586	-.058116	1.084785	.9283627
TECH				
Medium low-t~s	.097795	.0107806	1.202828	1.025789
Medium high-~s	-.2464938	-.1729716	.8095347	.7971217
High-tech in~s	-.4665148	.4454023	.3163297	1.862095
PORT				
Ports within~m	.3737206	-.3860872	1.213562	.8143429
OWN# TECH				
Subsidiaries~d	.0167806	-.0097284	1.086498	.9440775
Subsidiaries~n	-.1548838	-.0875312	.5842572	.6952937
Subsidiaries~e	-.1982356	.0372323	.2394495	1.238472
Independent#~u	.0690519	.0204485	1.285236	1.089623
Independent#~d	-.1444487	-.1158635	.7264934	.725659
Independent#~s	-.2412382	-.0834036	.2899957	.6511086
State#Medium~s	.0824759	.0141025	1.416778	1.07178
State#Medium~e	-.0522027	-.058627	.8602479	.8199404
State#High-t~s	-.1695883	-.0752881	.3558177	.6075134
OWN# PORT				
Subsidiaries~m	.15466	-.4940597	1.580807	.3405423
Independent#~m	.2079878	.0095914	1.479049	1.022687
State#Ports ~m	.1922844	-.0371255	1.629374	.8991243
TECH# PORT				
Medium low-t~s	.1009408	.0267686	1.901532	1.220518
Medium high-~t	.0580259	-.028046	1.248901	.8788183
High-tech in~i	-.0793904	-.0774466	.6360106	.5733475
logwages2015	-.1178178	.0333118	.9789061	.9773966
TFP2015	-.1640718	-.0194638	.9436583	.753784
logemp2015	.5230961	-.2649992	.8054291	.4910174
DEBTS2015	-.0480805	-.1713982	1.044732	1.105256
EXP2015	.9866436	.5284388	1.19234	1.33716
RD2015	.0320893	-.0347802	1.07672	.9080323

```
69.         // SD catastrophy. VR not good.
70.
71.         teffects overlap, ptlevel(1)
  note: refitting the model using the generate() option

72.         // Really bad overlap
73.
74. *-------------------------------------------------------------------------------*
75. *       PART 1.3: Interacting continuous variables
76. *-------------------------------------------------------------------------------*
77.
```

```
78. *       ATE:
79. *       ----
80.         cap drop osa1

81.         cap drop p1

82.         cap teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($F) c.($C)##c.($C), probit),
  >     ///
  >                                       osample(osa1) generate(p1)

83.                                    // violation of overlap assumption for 517 obs
  >
84.
85.         // Reestimate
86.         teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($F) c.($C)##c.($C), probit)
  >     ///
  >                                      if osa1 == 0
  note: c.RD2015#c.RD2015 omitted because of collinearity

  Treatment-effects estimation                   Number of obs      =     10,806
  Estimator      : propensity-score matching     Matches: requested =          1
  Outcome model  : matching                                  min =          1
  Treatment model: probit                                    max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.6404914**	**.4065309**	**1.58**	**0.115**	**-.1562946**	**1.437277**

```
87.
88.         tebalance summarize
  note: refitting the model using the generate() option
```

Covariate balance summary

	Raw	Matched
Number of obs =	**10,806**	**21,612**
Treated obs =	**4,379**	**10,806**
Control obs =	**6,427**	**10,806**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.0296564**	**-.0074986**	**.963209**	**.9884199**
Independent	**.0493119**	**-.0619182**	**1.017311**	**.9568052**
State	**.0859662**	**-.3947759**	**1.083397**	**.7121955**
TECH				
Medium low-t~s	**.0967955**	**-.4192341**	**1.200033**	**.5173689**
Medium high-~s	**-.2730446**	**-.2414952**	**.7962323**	**.7363969**
High-tech in~s	**-.4370594**	**.5229131**	**.3291976**	**2.010979**
PORT				
Ports within~m	**.362186**	**-.3379575**	**1.217509**	**.8453174**
logwages2015	**-.1135621**	**.0189978**	**.9839319**	**.8411125**
TFP2015	**-.1533354**	**.0907548**	**.9413751**	**.6313152**
logemp2015	**.5047852**	**-.1448515**	**.8227665**	**.7240572**
DEBTS2015	**-.046649**	**-.1962074**	**1.043789**	**1.04455**
EXP2015	**.9855717**	**.4823021**	**1.128684**	**.8291024**
RD2015	**.0305245**	**-.0403678**	**1.073402**	**.8968454**
logwages2015# logwages2015	**-.1097719**	**-.0193541**	**.9078147**	**.7553405**

logwages2015# TFP2015	-.1820843	.0471274	.8447797	.6370116
logwages2015# logemp2015	.2989881	-.084967	1.056371	.8143887
logwages2015# DEBTS2015	-.0984126	-.1263544	.9415307	.9913987
logwages2015# EXP2015	.4802566	.3411011	1.520854	1.077129
logwages2015# RD2015	.005873	-.0302671	1.0045	.9498151
TFP2015# TFP2015	-.1566951	-.0674541	.7569009	.7417334
TFP2015# logemp2015	.2247339	.1163817	1.174078	.8668083
TFP2015# DEBTS2015	-.1286154	.0121978	.8744371	.8274608
TFP2015# EXP2015	.3550242	.3912119	1.55326	.9248598
TFP2015# RD2015	.0091776	-.0378348	.9876637	.9073771
logemp2015# logemp2015	.4014532	-.2298534	1.283602	.7653755
logemp2015# DEBTS2015	.265946	-.1997139	1.193946	.8954807
logemp2015# EXP2015	.9600361	.0536706	2.116757	.6397359
logemp2015# RD2015	.1051467	-.0194703	1.44357	.9512365
DEBTS2015# DEBTS2015	-.0284606	-.1606492	1.028562	1.14724
DEBTS2015# EXP2015	.4395725	.0177655	1.876999	1.096801
DEBTS2015# RD2015	.0309799	-.0327963	1.159457	.9652985
EXP2015# EXP2015	.8910531	.4401832	2.161859	1.11097
EXP2015# RD2015	.1709683	.0178876	2.313563	1.204854

```
89.         // SD catastrophy. VR ok.
```

```
90.
91.         teffects overlap, ptlevel(1)
  note: refitting the model using the generate() option

92.
93.
94. *-------------------------------------------------------------------------------*
95. *       PART 1.4: Interacting all variables
96. *-------------------------------------------------------------------------------*
97.
98. *       ATE:
99. *       ----
100         cap drop osa1

101         cap drop p1

102         cap teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($F)##c.($C) i.($F)#i.($F) c.($C
  > )#c.($C), probit),  ///
  >                                       osample(osa1) generate(p1)

103                                    // violation of overlap assumption for 998 obs
  >
104
105         // Reestimate
106         teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($F)##c.($C) i.($F)#i.($F) c.($C
  > )#c.($C), probit)   ///
  >                                     if osa1 == 0
  note: c.RD2015#c.RD2015 omitted because of collinearity
```

Treatment-effects estimation — Number of obs = **10,325**
Estimator : **propensity-score matching** — Matches: requested = **1**
Outcome model : **matching** — min = **1**
Treatment model: **probit** — max = **1**

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.2710539**	**.1037054**	**2.61**	**0.009**	**.0677952**	**.4743127**

```
107
108         tebalance summarize
  note: refitting the model using the generate() option
```

Covariate balance summary

	Raw	Matched
Number of obs =	**10,325**	**20,650**
Treated obs =	**4,289**	**10,325**
Control obs =	**6,036**	**10,325**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.0254401**	**.012812**	**.9678422**	**1.02035**
Independent	**.0445485**	**-.0122957**	**1.013989**	**.991541**
State	**.0726972**	**-.3174045**	**1.070671**	**.8071879**
TECH				
Medium low-t~s	**.0721108**	**-.0269594**	**1.141821**	**.939488**
Medium high-~s	**-.2654943**	**-.4385424**	**.7951144**	**.7745673**
High-tech in~s	**-.3910595**	**.3847958**	**.3525313**	**1.902927**
PORT				
Ports within~m	**.3287484**	**-.3351472**	**1.186058**	**.8549054**

logwages2015	-.1071581	.1888825	.9781759	.8310842
TFP2015	-.1280384	-.0411463	.9577992	1.037031
logemp2015	.4412271	-.1429061	.8677675	.8374556
DEBTS2015	-.0424542	-.1073496	1.041573	1.252149
EXP2015	.963971	.231186	1.069713	.6618973
RD2015	.0222868	-.5144067	1.052606	.4304295
OWN#				
logwages2015				
Subsidiaries	-.0464712	.0144964	.8966239	1.024456
Independent	-.0031827	-.0092214	.9550719	.9989189
State	.0378452	-.1575417	.9938142	.954285
OWN#				
TFP2015				
Subsidiaries	-.0544001	.006319	.8503352	1.037043
Independent	-.0426693	-.0376967	.8998557	.9138182
State	.0428856	-.2031944	1.036774	1.012861
OWN#				
logemp2015				
Subsidiaries	.0959208	.0744117	1.349951	1.27999
Independent	.2110555	.0354518	1.329037	1.099062
State	.1810541	-.4111183	1.395384	.5423966
OWN#				
DEBTS2015				
Subsidiaries	-.0459723	.0306594	.8906547	1.14024
Independent	-.0201016	-.0012022	.9602726	.9951535
State	.0604999	-.1925018	1.056187	1.119962
OWN#				
EXP2015				
Subsidiaries	.1841057	.1346022	1.944355	1.600322
Independent	.3864675	.134375	2.278346	1.551061
State	.3207653	-.3784491	2.363097	.5392858
OWN#				
RD2015				
Subsidiaries	.0184441	-.0234281	1.111834	.8602062
Independent	.0266949	-.0340866	1.11513	.8518921
State	.015615	-.6272044	1.080911	.1485887
TECH#				
logwages2015				
Medium low-t~s	.0573673	-.0173966	1.104084	.9138388
Medium high-~s	-.2234088	-.2415362	.7757568	.9039214
High-tech in~s	-.3596063	.3459433	.3238866	1.571541
TECH#				
TFP2015				
Medium low-t~s	.0212769	-.0548983	.9946217	.8237821
Medium high-~s	-.2717203	-.2544239	.6181014	1.027555
High-tech in~s	-.3414906	.2157221	.3061538	.9920209
TECH#				
logemp2015				
Medium low-t~s	.1856198	.0194363	1.685285	1.064285
Medium high-~s	.0119241	-.4886167	1.235729	.4929365
High-tech in~s	-.2162771	.3382516	.6748786	1.618358
TECH#				
DEBTS2015				
Medium low-t~s	.0478768	-.0366038	1.099257	.8094874
Medium high-~s	-.2146657	-.2959094	.7275281	1.047198
High-tech in~s	-.3310658	.2194936	.3055743	1.317154
TECH#				
EXP2015				
Medium low-t~s	.3103474	.0882522	3.774137	1.68557
Medium high-~s	.0846877	-.4330938	2.010362	.5962369

High-tech in~s	-.266113	.4137345	.716081	2.185991
TECH# RD2015				
Medium low-t~s	.0329321	-.0110113	1.249262	.9169245
Medium high-~s	-.044875	-.6222077	.8101651	.1691323
High-tech in~s	-.1214468	.0169703	.3379806	1.147629
PORT# logwages2015				
Ports within~m	.2526504	-.1343372	1.22181	1.041929
PORT# TFP2015				
Ports within~m	.2337167	-.2176052	1.236171	1.073709
PORT# logemp2015				
Ports within~m	.3297375	-.3965847	1.428243	.6787637
PORT# DEBTS2015				
Ports within~m	.2364682	-.3827837	1.312008	.6918818
PORT# EXP2015				
Ports within~m	.5808544	-.3257323	2.328916	.706659
PORT# RD2015				
Ports within~m	.0922146	-.6080288	1.520707	.1760999
OWN# TECH				
Subsidiaries~d	-.0002068	-.0332365	.9990546	.8143094
Subsidiaries~n	-.1647821	-.0403806	.5596813	.8607534
Subsidiaries~e	-.1727873	.0705019	.2806762	1.505903
Independent#~u	.0588365	.0289098	1.231306	1.122128
Independent#~d	-.1561896	-.139814	.710783	.6879174
Independent#~s	-.2184241	-.0947114	.3127497	.5887462
State#Medium~s	.0670459	-.0349927	1.32147	.8438696
State#Medium~e	-.0603027	-.4013613	.8387705	.510536
State#High-t~s	-.1381689	-.0051006	.4121342	.9685102
OWN# PORT				
Subsidiaries~m	.1314865	.0424182	1.479203	1.149548
Independent#~m	.1999284	.0505403	1.443204	1.125032
State#Ports ~m	.1543922	-.5108366	1.481083	.3894707
TECH# PORT				
Medium low-t~s	.0822463	-.0177567	1.68804	.8867212
Medium high-~t	.0247008	-.5576174	1.102191	.2629761
High-tech in~i	-.0641974	-.0150779	.676471	.9070229
logwages2015# logwages2015	-.1053055	.1256852	.9100322	.8267782
logwages2015# TFP2015	-.1573758	.0488635	.8834608	.8876602
logwages2015# logemp2015	.255086	.0967585	1.060188	1.024979
logwages2015# DEBTS2015	-.0888846	.0315601	.9502971	.9806778
logwages2015# EXP2015	.4732792	.4298545	1.464422	1.341204
logwages2015#				

RD2015	-.0042538	-.2334748	.9677916	.9911701
TFP2015# TFP2015	-.1288171	-.0259244	.7989514	.9822542
TFP2015# logemp2015	.1866108	-.1337727	1.174858	1.026351
TFP2015# DEBTS2015	-.1069152	-.0469637	.9095211	1.314059
TFP2015# EXP2015	.3551762	.1025752	1.530878	1.263023
TFP2015# RD2015	.0048065	-.3829336	.9887689	.6729874
logemp2015# logemp2015	.3600574	-.1819571	1.278264	1.034739
logemp2015# DEBTS2015	.2231033	-.2045971	1.191953	.9146623
logemp2015# EXP2015	.9070873	-.0651843	2.133949	.5632524
logemp2015# RD2015	.0890926	-.5644772	1.391259	.284626
DEBTS2015# DEBTS2015	-.0251364	-.0286786	1.027106	1.573095
DEBTS2015# EXP2015	.4264221	-.0671089	1.804624	.877836
DEBTS2015# RD2015	.0224589	-.5411761	1.123437	.346861
EXP2015# EXP2015	.8672906	.1349951	1.958271	.7257833
EXP2015# RD2015	.1605835	-.5596387	2.189125	.2698533

```
109         // SD catastrophy. VR too.
110
111         teffects overlap, ptlevel(1)
  note: refitting the model using the generate() option

112         // Really bad overlap
113
114
115 /*      There is no way of getting good overlap with the complete model, TECH is
  >         too good at explaining who gets the treatment. Redo this all with improved
  >         model (i.e. excluding TECH).                                  */
116
117
118
119 ********************************************************************************
```

```
120 *                                       PART 2: Improved Model (w/o TECH)
121 ********************************************************************************/
122
123 //      Setting global for interaction terms
124         global D "OWN PORT"                       // Dummies without TECH

125
126 *-------------------------------------------------------------------------------*
127 *       PART 2.1: No interactions
128 *-------------------------------------------------------------------------------*
  >
129
130 *========*
131 * Logit
132 *========*
133         cap drop osa1

134         cap drop p1

135         teffects psmatch (TFP2017) ///
  >                                        (FDI2016 i.OWN /*i.TECH*/ PORT ///
  >                                         logwages2015 TFP2015 logemp2015 DEBTS2015
  > EXP2015 RD2015),    ///
  >                                         osample(osa1) generate(p1)

Treatment-effects estimation                   Number of obs      =     11,323
Estimator      : propensity-score matching     Matches: requested =          1
Outcome model  : matching                                  min =          1
Treatment model: logit                                     max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.2865274**	**.0401897**	**7.13**	**0.000**	**.2077569**	**.3652978**

```
136
137         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_log_noTECH.gph, r
  > eplace)
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_log_noTECH.gph saved)

138         graph export $results\03a_PSM\overl_log_noTECH.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_log_noTECH.pdf written in PDF format)

139         // Much better overlap
140
141         tebalance summarize

    Covariate balance summary
```

	Raw	Matched
Number of obs =	**11,323**	**22,646**
Treated obs =	**4,460**	**11,323**
Control obs =	**6,863**	**11,323**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.018354**	**-.0160171**	**.9769702**	**.9793621**
Independent	**.0616272**	**.0503382**	**1.02321**	**1.017008**
State	**.1016402**	**-.0164647**	**1.100951**	**.9842807**
PORT	**.4092869**	**-.0810373**	**1.253595**	**.9498604**
logwages2015	**-.1300321**	**.0374587**	**.9769191**	**1.042444**
TFP2015	**-.178877**	**-.0064165**	**.9473458**	**.948644**

logemp2015	.5654306	-.0320107	.803081	.7767628
DEBTS2015	-.0529435	.001263	1.051101	1.025652
EXP2015	1.014184	-.0033961	1.228659	1.065878
RD2015	.0356507	.0384723	1.085768	1.092489

```
142         // SD way below 10% for all variables. VR fine.
143
144 *========*
145 * Probit
146 *========*
147         cap drop osa1

148         cap drop p1

149         teffects psmatch (TFP2017) ///
  >                                        (FDI2016 i.OWN /*i.TECH*/ PORT ///
  >                                         logwages2015 TFP2015 logemp2015 DEBTS2015
  > EXP2015 RD2015, probit),    ///
  >                                         osample(osa1) generate(p1)
```

Treatment-effects estimation — Number of obs = **11,323**
Estimator : **propensity-score matching** — Matches: requested = **1**
Outcome model : **matching** — min = **1**
Treatment model: **probit** — max = **1**

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	.2223145	.0364267	6.10	0.000	.1509195	.2937094

```
150
151         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_prob_noTECH.gph,
  > replace)
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH.gph saved)

152         graph export $results\03a_PSM\overl_prob_noTECH.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH.pdf written in PDF format)

153         // Much better overlap
154
155         tebalance summarize
```

Covariate balance summary

	Raw	Matched
Number of obs =	**11,323**	**22,646**
Treated obs =	**4,460**	**11,323**
Control obs =	**6,863**	**11,323**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	-.018354	-.0081774	.9769702	.9895909
Independent	.0616272	.0693015	1.02321	1.022923
State	.1016402	-.0352257	1.100951	.9659939
PORT	.4092869	-.061225	1.253595	.9640831
logwages2015	-.1300321	.0278419	.9769191	1.054893
TFP2015	-.178877	-.0392246	.9473458	.9137121
logemp2015	.5654306	-.0521579	.803081	.7857115
DEBTS2015	-.0529435	-.0287099	1.051101	1.011085
EXP2015	1.014184	-.0160792	1.228659	1.059189
RD2015	.0356507	.0484329	1.085768	1.11665

```
156         // SD way below 10% for all variables. VR fine.
157
158
159 *-------------------------------------------------------------------------------*
160 *       PART 2.2: Interacting dummies
161 *-------------------------------------------------------------------------------*
  >
162
163         cap drop osa1

164         cap drop p1

165         teffects psmatch (TFP2017) ///
  >                                  (FDI2016 i.($D)##i.($D) $C, probit), ///
  >                                   osample(osa1) generate(p1)

Treatment-effects estimation                    Number of obs      =     11,323
Estimator      : propensity-score matching      Matches: requested =          1
Outcome model  : matching                                   min =          1
Treatment model: probit                                     max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.2604231**	**.0412533**	**6.31**	**0.000**	**.1795681**	**.341278**

```
166
167         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_prob_noTECH#d.gph
  > , replace)
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#d.gph saved)

168         graph export $results\03a_PSM\overl_prob_noTECH#d.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#d.pdf written in PDF format)

169
170         tebalance summarize

    Covariate balance summary
                                                Raw       Matched
                              Number of obs =       11,323       22,646
                              Treated obs   =        4,460       11,323
                              Control obs   =        6,863       11,323
```

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.018354**	**-.0410364**	**.9769702**	**.9491118**
Independent	**.0616272**	**.0624248**	**1.02321**	**1.022045**
State	**.1016402**	**-.0013726**	**1.100951**	**.9986771**
PORT				
Ports within~m	**.4092869**	**-.0727436**	**1.253595**	**.955704**
OWN# PORT				
Subsidiaries~m	**.1681577**	**-.0460174**	**1.655079**	**.8726442**
Independent#~m	**.2283994**	**-.0142944**	**1.553098**	**.9715928**
State#Ports ~m	**.2100907**	**-.0549794**	**1.72322**	**.86683**
logwages2015	**-.1300321**	**.0405305**	**.9769191**	**1.042473**
TFP2015	**-.178877**	**-.0181125**	**.9473458**	**.9103725**

logemp2015	.5654306	-.032559	.803081	.7935212
DEBTS2015	-.0529435	-.0019045	1.051101	.9851882
EXP2015	1.014184	-.0143442	1.228659	1.029228
RD2015	.0356507	.0241905	1.085768	1.058238

```
171         // SD better for some, worse for others but all still below 10%. VR fine.
172
173 *-------------------------------------------------------------------------------*
174 *       PART 2.3: Interacting continuous variables
175 *-------------------------------------------------------------------------------*
  >
176
177         cap drop osa1

178         cap drop p1

179         teffects psmatch (TFP2017) ///
  >                                       (FDI2016 i.($D) c.($C)##c.($C), probit), //
  > /
  >                                        osample(osa1) generate(p1)
  note: c.RD2015#c.RD2015 omitted because of collinearity

  Treatment-effects estimation                   Number of obs      =     11,323
  Estimator      : propensity-score matching     Matches: requested =          1
  Outcome model  : matching                                  min =          1
  Treatment model: probit                                    max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	.3157963	.0445057	7.10	0.000	.2285668	.4030259

```
180
181         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_prob_noTECH#c.gph
  > , replace)
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#c.gph saved)

182         graph export $results\03a_PSM\overl_prob_noTECH#c.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#c.pdf written in PDF format)

183
184         tebalance summarize

    Covariate balance summary
```

	Raw	Matched
Number of obs =	11,323	22,646
Treated obs =	4,460	11,323
Control obs =	6,863	11,323

	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
OWN				
Subsidiaries	-.018354	-.0353768	.9769702	.9551152
Independent	.0616272	.048925	1.02321	1.016783
State	.1016402	-.0326588	1.100951	.9675142
PORT				
Ports within~m	.4092869	-.0402926	1.253595	.9755097
logwages2015	-.1300321	.0453348	.9769191	1.048406
TFP2015	-.178877	.0038154	.9473458	.9637534
logemp2015	.5654306	-.0227981	.803081	.9819297

DEBTS2015	-.0529435	-.0276597	1.051101	.9875955
EXP2015	1.014184	.0282445	1.228659	1.020167
RD2015	.0356507	.1012005	1.085768	1.241569
logwages2015# logwages2015	-.1270817	.0532239	.8915375	1.166669
logwages2015# TFP2015	-.2111643	.0369172	.8218612	1.060541
logwages2015# logemp2015	.3407506	-.0034099	1.047719	1.048029
logwages2015# DEBTS2015	-.1126574	.0008502	.9308646	.9831086
logwages2015# EXP2015	.4877908	.0390508	1.596602	1.092197
logwages2015# RD2015	.0055913	.1167257	.9912599	1.457108
TFP2015# TFP2015	-.1782962	-.0077241	.7484152	.8979636
TFP2015# logemp2015	.2520123	-.0213416	1.177958	1.065965
TFP2015# DEBTS2015	-.1505594	-.0084683	.8636042	.9851204
TFP2015# EXP2015	.3461007	.0294409	1.606777	1.061456
TFP2015# RD2015	.0080044	.0870641	.9791256	1.275644
logemp2015# logemp2015	.4473602	-.0261481	1.372389	.8524584
logemp2015# DEBTS2015	.3032082	-.0196536	1.209775	.9364184
logemp2015# EXP2015	1.005258	-.016285	2.298259	.940901
logemp2015# RD2015	.1258157	.0248697	1.551717	1.196106
DEBTS2015# DEBTS2015	-.0320182	-.0286538	1.03153	.9815837
DEBTS2015# EXP2015	.4487436	-.0047179	1.961847	1.00244
DEBTS2015# RD2015	.0328123	.051814	1.167688	1.145462
EXP2015# EXP2015	.9199068	.0293965	2.461787	1.116678
EXP2015# RD2015	.1814	.100469	2.455883	1.335678

```
185         // SD now worse (one above 10%). VR fine.
186
187 *-------------------------------------------------------------------------------*
188 *       PART 2.4: Interacting all variables
189 *-------------------------------------------------------------------------------*
  >
190
191         cap drop osa1

192         cap drop p1

193         cap teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($D)##c.($C) i.($D)#i.($D) c.($C
  > )#c.($C), probit), ///
  >                                       osample(osa1) generate(p1)

194                                       // Treatment overlap assumption violated b
  > y 1 obs
195
196         // Reestimate
197         teffects psmatch (TFP2017) ///
  >                                      (FDI2016 i.($D)##c.($C) i.($D)#i.($D) c.($C
  > )#c.($C), probit) ///
  >                                       if osa1 == 0
  note: c.RD2015#c.RD2015 omitted because of collinearity

  Treatment-effects estimation                   Number of obs      =     11,322
  Estimator      : propensity-score matching     Matches: requested =          1
  Outcome model  : matching                                  min =          1
  Treatment model: probit                                    max =          1
```

TFP2017	Coef.	AI Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
ATE						
FDI2016 (1 vs 0)	**.4052654**	**.0429813**	**9.43**	**0.000**	**.3210236**	**.4895071**

```
198
199         tebalance summarize
  note: refitting the model using the generate() option

    Covariate balance summary
```

	Raw	Matched
Number of obs =	**11,322**	**22,644**
Treated obs =	**4,460**	**11,322**
Control obs =	**6,862**	**11,322**

	Standardized differences Raw	Matched	Variance ratio Raw	Matched
OWN				
Subsidiaries	**-.0184349**	**-.0187229**	**.9768716**	**.9769743**
Independent	**.0615096**	**.0545557**	**1.023158**	**1.019537**
State	**.1015529**	**-.0348301**	**1.100848**	**.9654375**
PORT				
Ports within~m	**.4091945**	**-.0673663**	**1.253481**	**.9541755**
logwages2015	**-.1297996**	**.0790688**	**.9771606**	**1.083897**
TFP2015	**-.1787741**	**.056393**	**.9472701**	**1.074252**
logemp2015	**.5651696**	**-.0432932**	**.8036574**	**.9785488**
DEBTS2015	**-.0528354**	**-.0373269**	**1.051033**	**.995618**
EXP2015	**1.014054**	**.0244985**	**1.228622**	**1.029856**
RD2015	**.0355978**	**.066523**	**1.085631**	**1.15458**
OWN#				
logwages2015				

Subsidiaries	-.0502222	-.0042472	.878645	1.044126
Independent	.0094366	.0986882	.9614275	1.215039
State	.0577787	-.0188454	1.020437	.9708185
OWN# TFP2015				
Subsidiaries	-.0642204	.0016398	.8275251	.9729742
Independent	-.0409813	.089902	.8830965	1.215395
State	.0557397	-.0406704	1.040067	.9281673
OWN# logemp2015				
Subsidiaries	.139845	-.036068	1.482033	.8802298
Independent	.2655514	-.0026044	1.407635	1.065857
State	.239786	-.0312108	1.529392	.883221
OWN# DEBTS2015				
Subsidiaries	-.0445397	-.0027844	.8860288	1.017765
Independent	-.0149665	.0273305	.9653564	1.036393
State	.0840047	-.0348602	1.078116	.9559785
OWN# EXP2015				
Subsidiaries	.2092434	-.0304243	2.149306	.904761
Independent	.4017684	.0527756	2.430033	1.076248
State	.3628567	-.0018981	2.655894	1.067842
OWN# RD2015				
Subsidiaries	.0128147	.0133952	1.076414	1.083661
Independent	.0357341	.080789	1.160491	1.362633
State	.0405059	.006686	1.224085	1.031469
PORT# logwages2015				
Ports within~m	.3127717	-.0443448	1.297044	.9816333
PORT# TFP2015				
Ports within~m	.2839104	-.0273731	1.301141	1.021654
PORT# logemp2015				
Ports within~m	.4110343	-.061015	1.577416	.8911981
PORT# DEBTS2015				
Ports within~m	.3018069	-.0516554	1.430955	.925792
PORT# EXP2015				
Ports within~m	.6536706	-.0114963	2.641332	.9854243
PORT# RD2015				
Ports within~m	.1184263	-.0103045	1.722629	.950634
OWN# PORT				
Subsidiaries~m	.1681204	-.0534661	1.654854	.849262
Independent#~m	.228347	-.0437045	1.552902	.9126032
State#Ports ~m	.2100497	-.0273231	1.72299	.9276058
logwages2015# logwages2015	-.1268021	.0925415	.8919063	1.210198
logwages2015# TFP2015	-.2109065	.1064227	.8221359	1.430085
logwages2015# logemp2015	.3404394	-.0171726	1.048665	1.073634

logwages2015# DEBTS2015	-.1123757	-.0021322	.9312625	.9840218
logwages2015# EXP2015	.487771	.0654385	1.59637	1.101214
logwages2015# RD2015	.0055442	.127549	.9911303	1.684089
TFP2015# TFP2015	-.1782203	.0726567	.7483282	1.130438
TFP2015# logemp2015	.2517498	-.0280762	1.17853	1.161131
TFP2015# DEBTS2015	-.150387	-.0244992	.8636462	.9498006
TFP2015# EXP2015	.346056	.063324	1.606561	1.100693
TFP2015# RD2015	.0079587	.1125685	.9789967	1.697195
logemp2015# logemp2015	.4472986	-.0454075	1.372216	.8532004
logemp2015# DEBTS2015	.3029553	-.0322389	1.210345	.8872106
logemp2015# EXP2015	1.005117	.0047744	2.298656	1.006045
logemp2015# RD2015	.1257768	-.0419072	1.551508	1.099899
DEBTS2015# DEBTS2015	-.0319387	-.0349473	1.031424	.9692877
DEBTS2015# EXP2015	.4487052	-.0041379	1.961577	1.03821
DEBTS2015# RD2015	.0327701	.0094719	1.167532	.97769
EXP2015# EXP2015	.9198114	.0280264	2.461657	1.152397
EXP2015# RD2015	.1813612	.0536363	2.455561	1.150536

```
200         // SD above 10% for some interactions. VR fine.
201
202         teffects overlap, ptlevel(1) saving($results\03a_PSM\overl_prob_noTECH#all.g
  > ph, replace)
  note: refitting the model using the generate() option
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#all.gph saved)
```

```
203         graph export $results\03a_PSM\overl_prob_noTECH#all.pdf, as(pdf) replace
  (file C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconometrics\
  > fdimatching_clean\04_results\03a_PSM\overl_prob_noTECH#all.pdf written in PDF format
  > )

204
205
  end of do-file

206
207         log close
       name:  <unnamed>
        log:  C:\Users\Emilie\Documents\Emilie\Uni\Master\Nottingham\2_Appl_Microeconom
  > etrics\fdimatching_clean\03_log\03a_PSM.smcl
    log type:  smcl
   closed on:  30 Mar 2020, 09:29:31
  ------------------------------------------------------------------------------------
```