Methodology

Ordinary Least Squares (OLS) estimation by pooling the data points together is unlikely to be effective in this setting due to the presence of both heteroscedasticity and autocorrelation which are a feature of panel data. To test this, White's test for heteroscedasticity was run on pooled OLS data and the null hypothesis of no heteroscedasticity was accepted (p-value = 0.355) for China, (p-value=0.1742) for India and 0.0843 for combined data. It indicates that the used pooled OLS data will give unbiased and consistent results. Thus us sufficient for proceeding with the random effects. In both the fixed-effects and random-effects methods, the intercept term in the regression is allowed to vary (as opposed to OLS where the intercept is a constant). In fixed-effects, this is done by including a dummy variable for each state to capture any state specific effects. In random effects, this is done by assuming a fixed intercept term plus a random term. The random effects estimator generally yields estimates with a higher precision. However, if this random term happens to be correlated with any of the explanatory variables, the estimates turn out to be both biased and inconsistent. By contrast, fixed-effects always yield consistent estimates. It is standard practice to use a Hausman test to determine which one of the competing estimation methods is appropriate. For our model, a Hausman test rejects random effects estimation in favour of fixed-effects. Hence all relationships are estimated using fixed-effects. In addition, to account for autocorrelation, we assume an error term with AR(1) disturbances.

The data was detrended by using the panel regression model and the residuals of the variables were generated by using stata.

Estimation of results

China

Difference in Difference method

Regression method was used to compare the effect of anti corruption law on corruption in two countries. Only china passed anti corruption law during the year 2006.

Source	SS	df	MS	Number of obs =	434
				F(3, 430) =	3.96
Model	933.872246	3	311.290749	Prob > F =	0.0083
Residual	33786.1278	430	78.5723901	R-squared =	0.0269
				Adj R-squared =	0.0201
Total	34720	433	80.1847575	Root MSE =	8.8641

id	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pt	.2919332	2.336162	0.12	0.901	-4.299785	4.883652
post	.8690476	2.082496	0.42	0.677	-3.224089	4.962185
dummy	-3.321429	1.062898	-3.12	0.002	-5.41055	-1.232307
_cons	17.75	.7715215	23.01	0.000	16.23358	19.26642

The results concluded with non significant findings the coefficient of pt is 0.292 which is the difference in difference estimator and the t test statistic was 0.12 and its corresponding p value was 0.901 which was not significant indicating that the there is no significant difference in decrease of corruption after anti corruption law.

```
Fixed-effects (within) regression               Number of obs      =       124
Group variable: id                              Number of groups   =        31

R-sq:  within  = 0.7059                         Obs per group: min =         4
       between = 0.5592                                        avg =       4.0
       overall = 0.2938                                        max =         4

                                                F(8,85)            =     25.50
corr(u_i, Xb)  = -0.9545                        Prob > F           =    0.0000
```

lnFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggovtexp~e L1.	.8184356	.3193405	2.56	0.012	.1835011	1.45337
lninfrastr~e L1.	4.339274	.8722091	4.98	0.000	2.605088	6.073459
corruption L1.	-.1575798	.2372781	-0.66	0.508	-.6293523	.3141926
grossindus~y L1.	-.0255716	.0375184	-0.68	0.497	-.1001681	.049025
lnNSDP L1.	-.2327283	.0922755	-2.52	0.014	-.4161966	-.04926
studentenr~t L1.	9.09e-07	1.39e-06	0.65	0.515	-1.86e-06	3.67e-06
logpercapi~r L1.	-3.47e-08	7.46e-08	-0.46	0.643	-1.83e-07	1.14e-07
population L1.	-.0000143	8.35e-06	-1.71	0.090	-.0000309	2.30e-06
_cons	-68.51476	10.5266	-6.51	0.000	-89.44447	-47.58505
sigma_u	4.7167601					
sigma_e	1.1498338					
rho	.94390662	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(30, 85) =     2.15                 Prob > F = 0.0033
```

Table above shows the lagged estimations of government expenditure, infrastructure, corruption, gross industrial production, NSDP, Student enrollment, log naturals of per capita income and population over FDI. The coefficients lags of infrastructure and NSDP were found be significant.

Impact of corruption on investment

The estimation results for corruption with FDI for different regions of China show that the coefficients of corruption were positive and not significant at either 1 percent or 5 percent. Thus this factor does not have any impact on FDI growth in China as per model.

```
FE (within) regression with AR(1) disturbances  Number of obs      =        93
Group variable: id                              Number of groups   =        31

R-sq:  within  = 0.0882                         Obs per group: min =         3
       between = 0.0188                                        avg =       3.0
       overall = 0.0068                                        max =         3

                                                F(8,54)            =      0.65
corr(u_i, Xb)  = -0.8892                        Prob > F           =    0.7300

------------------------------------------------------------------------------
       lnFDI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
loggovtexp~e |   .4590751   .4242778     1.08   0.284    -.3915507    1.309701
lninfrastr~e |  -1.709857   1.480497    -1.15   0.253    -4.678076    1.258361
  corruption |   .1982232   .3128128     0.63   0.529    -.4289288    .8253752
grossindus~y |  -.0397996   .0375382    -1.06   0.294    -.1150592      .03546
       lnNSDP |   .0007721   .0918627     0.01   0.993    -.1834016    .1849458
studentenr~t |   4.04e-06   3.01e-06     1.34   0.185    -1.99e-06    .0000101
logpercapi~r |  -3.31e-08   7.57e-08    -0.44   0.663    -1.85e-07    1.19e-07
  population |  -.0000105   9.75e-06    -1.08   0.285    -.0000301    9.02e-06
       _cons |   19.56484   16.43658     1.19   0.239    -13.38852     52.5182
-------------+----------------------------------------------------------------
      rho_ar |  .04148137
     sigma_u |  2.5287057
     sigma_e |  1.1151472
     rho_fov |  .83718662   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(30,54) =     1.40                 Prob > F = 0.1381
```

Impact of Corruption on regional domestic product

Variable corruption was also used to estimate the coefficients with NSDP for different regions of China. Even the estimates of corruption were found to be negative and not significant at either 1 percent or 5 percent levels as shown in the table below.

```
FE (within) regression with AR(1) disturbances  Number of obs      =        93
Group variable: id                              Number of groups   =        31

R-sq:  within  = 0.8229                         Obs per group: min =         3
       between = 0.0641                                        avg =       3.0
       overall = 0.4609                                        max =         3

                                                F(7,55)            =     36.50
corr(u_i, Xb)  = -0.6726                        Prob > F           =    0.0000
```

lnNSDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggovtexp~e	-1.490971	.5607238	-2.66	0.010	-2.614687	-.3672558
lninfrastr~e	1.922636	2.480263	0.78	0.442	-3.047921	6.893194
corruption	-.3366583	.5088791	-0.66	0.511	-1.356475	.6831581
grossindus~y	-.1740162	.0505337	-3.44	0.001	-.2752879	-.0727445
studentenr~t	-3.27e-06	5.85e-06	-0.56	0.578	-.000015	8.44e-06
logpercapi~r	5.58e-07	8.04e-08	6.93	0.000	3.97e-07	7.19e-07
population	-.0000333	.000017	-1.96	0.056	-.0000675	8.32e-07
_cons	5.335998	18.5957	0.29	0.775	-31.93062	42.60262
rho_ar	-.42756917					
sigma_u	2.4673958					
sigma_e	2.0280829					
rho_fov	.59679886	(fraction of variance because of u_i)				

```
F test that all u_i=0:     F(30,55) =     0.26                 Prob > F = 0.9999
```

Impact of FDI on regional domestic product

On examining the interaction effect of log naturals of FDI and GRP yielded negative coefficients which were neither significant at 1 percent or 5 percent levels.

```
FE (within) regression with AR(1) disturbances  Number of obs      =        93
Group variable: id                              Number of groups   =        31

R-sq:  within  = 0.8218                         Obs per group: min =         3
       between = 0.1851                                        avg =       3.0
       overall = 0.5899                                        max =         3

                                                F(7,55)            =     36.23
corr(u_i, Xb)  = -0.5596                        Prob > F           =    0.0000
```

lnNSDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
loggovtexp~e	-1.479865	.5658718	-2.62	0.011	-2.613898	-.345833
lninfrastr~e	1.71546	2.515617	0.68	0.498	-3.32595	6.75687
lnFDI	-.0634177	.2172895	-0.29	0.771	-.4988755	.3720402
grossindus~y	-.1748319	.0509392	-3.43	0.001	-.2769163	-.0727474
studentenr~t	-1.66e-06	5.39e-06	-0.31	0.759	-.0000125	9.14e-06
logpercapi~r	5.53e-07	8.10e-08	6.83	0.000	3.91e-07	7.15e-07
population	-.0000366	.0000168	-2.17	0.034	-.0000704	-2.85e-06
_cons	5.461328	18.78405	0.29	0.772	-32.18275	43.10541
rho_ar	-.43172257					
sigma_u	1.7764441					
sigma_e	2.0391498					
rho_fov	.43147429	(fraction of variance because of u_i)				

```
F test that all u_i=0:     F(30,55) =     0.25                 Prob > F = 1.0000
```

India

Difference in Difference method

Regression method was used to compare the effect of anti corruption law on corruption in two countries. Only china passed anti corruption law during the year 2006.

Source	SS	df	MS	Number of obs =	434
				F(3, 430) =	3.96
Model	933.872246	3	311.290749	Prob > F =	0.0083
Residual	33786.1278	430	78.5723901	R-squared =	0.0269
				Adj R-squared =	0.0201
Total	34720	433	80.1847575	Root MSE =	8.8641

id	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
pt	.2919332	2.336162	0.12	0.901	-4.299785	4.883652
post	.8690476	2.082496	0.42	0.677	-3.224089	4.962185
dummy	-3.321429	1.062898	-3.12	0.002	-5.41055	-1.232307
_cons	17.75	.7715215	23.01	0.000	16.23358	19.26642

The results concluded with non significant findings the coefficient of pt is 0.292 which is the difference in difference estimator and the t test statistic was 0.12 and its corresponding p value was 0.901 which was not significant indicating that the there is no significant difference in decrease of corruption after anti corruption law.

```
Fixed-effects (within) regression               Number of obs      =       113
Group variable: ID                              Number of groups   =        28

R-sq:  within  = 0.2715                         Obs per group: min =         1
       between = 0.5840                                        avg =       4.0
       overall = 0.6500                                        max =         5

                                                F(6,79)            =      4.91
corr(u_i, Xb)  = 0.7111                         Prob > F           =    0.0003
```

lnFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngovtexp L1.	.167261	.062249	2.69	0.009	.0433575	.2911645
lnCorruption L1.	.1860186	.0571167	3.26	0.002	.0723307	.2997065
lninfra L1.	.009643	.0232948	0.41	0.680	-.0367242	.0560103
lnNSDP L1.	-.0063253	.0289188	-0.22	0.827	-.0638867	.0512361
literacyra~s L1.	-.003229	.0041678	-0.77	0.441	-.0115249	.0050668
population L1.	-1.59e-09	6.75e-10	-2.36	0.021	-2.94e-09	-2.47e-10
_cons	10.47731	.8079926	12.97	0.000	8.86904	12.08558
sigma_u	2.050632					
sigma_e	.34325934					
rho	.97274365	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(27, 79) =    67.01                 Prob > F = 0.0000
```

Table above shows the lagged estimations of government expenditure, infrastructure, corruption, infrastructure, NSDP, Student enrollment, and population over FDI. The coefficients lags of government expenditure, Corruption and population were found be significant.

Impact of corruption on investment

On estimating the results for impact of corruption on investment for different states of India shows that the coefficients of corruption is positive and not significant at either 1 percent or 5 percent. Thus corruption factor does not have any impact on FDI growth in India as per model especially on states with high corruption index than 103.3.

```
-> dummy = 1

FE (within) regression with AR(1) disturbances  Number of obs      =        39
Group variable: ID                              Number of groups   =        13

R-sq:  within  = 0.2998                         Obs per group: min =         1
       between = 0.5396                                        avg =       3.0
       overall = 0.5274                                        max =         4

                                                F(7,19)            =      1.16
corr(u_i, Xb)  = -0.4570                        Prob > F           =    0.3688

------------------------------------------------------------------------------
       lnFDI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   lngovtexp |   .1190509    .122092     0.98   0.342    -.1364906    .3745924
     lninfra |  -.0224506   .0529533    -0.42   0.676    -.1332831     .088382
      lnNSDP |   .0903717   .0572827     1.58   0.131    -.0295224    .2102658
lnCorruption |   1.345442   .8987558     1.50   0.151    -.5356755    3.226559
dummy_corr~n |  -9.40e-06   .0000213    -0.44   0.664    -.0000539    .0000351
literacyra~s |   .0008494   .0099011     0.09   0.933    -.0198739    .0215727
  population |  -4.66e-09   5.89e-09    -0.79   0.438    -1.70e-08    7.67e-09
       _cons |  -.6703114   9.631727    -0.07   0.945    -20.82975    19.48912
-------------+----------------------------------------------------------------
      rho_ar |  -.03172486
     sigma_u |   1.1162932
     sigma_e |   .39286762
     rho_fov |   .88978945   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(12,19) =    11.94                 Prob > F = 0.0000
```

On estimating the results for impact of corruption on investment among the states with corruption index less than 103.3. The corruption had showed negative and non signifcant coefficients with the ivestment especially in states with corruption index less than 103.3.

```
-> dummy = 0

FE (within) regression with AR(1) disturbances  Number of obs      =        46
Group variable: ID                              Number of groups   =        14

R-sq:  within  = 0.1193                         Obs per group: min =         1
       between = 0.7963                                        avg =       3.3
       overall = 0.7441                                        max =         4

                                                F(6,26)            =      0.59
corr(u_i, Xb)  = -0.8748                        Prob > F           =    0.7376

------------------------------------------------------------------------------
       lnFDI |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   lngovtexp |   -.061875   .1093116    -0.57   0.576    -.2865682    .1628182
     lninfra |   .0464238   .0375282     1.24   0.227    -.0307164    .1235641
      lnNSDP |  -.0243862   .0717839    -0.34   0.737      -.17194    .1231677
lnCorruption |  -.1403454   .2365733    -0.59   0.558    -.6266287    .3459379
literacyra~s |   .0113991   .0112353     1.01   0.320    -.0116954    .0344936
  population |   1.13e-09   2.72e-09     0.41   0.682    -4.47e-09    6.72e-09
       _cons |   17.71616    .215001    82.40   0.000     17.27422     18.1581
-------------+----------------------------------------------------------------
      rho_ar |  .93190604
     sigma_u |  3.0020403
     sigma_e |  .48792016
     rho_fov |    .974264   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(13,26) =     2.81                 Prob > F = 0.0121
```

Impact of Corruption on regional domestic product

The estimates for corruption were negative impact on the regional domestic product of different states of India with a corruption index more than 103.3. Even the estimates of corruption was found to be negative and not significant at either 1 percent or 5 percent levels as shown in the table below.

```
-> dummy = 1

FE (within) regression with AR(1) disturbances  Number of obs      =        39
Group variable: ID                              Number of groups   =        13

R-sq:  within  = 0.3640                         Obs per group: min =         1
       between = 0.5058                                        avg =       3.0
       overall = 0.0919                                        max =         4

                                                F(7,19)           =      1.55
corr(u_i, Xb)  = -0.9392                        Prob > F          =    0.2094
```

lnNSDP	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngovtexp	-.4354857	.5253744	-0.83	0.417	-1.535107	.6641355
lninfra	-.1945445	.216566	-0.90	0.380	-.6478224	.2587335
lnCorruption	-.4327761	1.49927	-0.29	0.776	-3.570785	2.705233
dummy_corr~n	-.0000535	.0000795	-0.67	0.509	-.00022	.000113
literacyra~s	-.0240629	.0365104	-0.66	0.518	-.10048	.0523543
population	3.04e-08	2.52e-08	1.20	0.243	-2.24e-08	8.31e-08
lnFDI	1.220525	.8908443	1.37	0.187	-.6440339	3.085083
_cons	6.14786	8.326063	0.74	0.469	-11.27879	23.57451
rho_ar	-.17876183					
sigma_u	3.4037176					
sigma_e	1.6714885					
rho_fov	.80569989	(fraction of variance because of u_i)				

```
F test that all u_i=0:     F(12,19) =     0.61                 Prob > F = 0.8106
```

Table below shows the estimates of impact of corruption on regionla domestic product index in states with corruption index less than 103.3. The coefficients for corruption was negative and non signifcant in states with corruption index less than 103.3.

```
-> dummy = 0

FE (within) regression with AR(1) disturbances  Number of obs      =        46
Group variable: ID                              Number of groups   =        14

R-sq:  within  = 0.2640                         Obs per group: min =         1
       between = 0.7459                                        avg =       3.3
       overall = 0.6104                                        max =         4

                                                F(6,26)            =      1.55
corr(u_i, Xb)  = -0.8284                        Prob > F           =    0.2004

------------------------------------------------------------------------------
       lnNSDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
    lngovtexp |   .1822937   .3304113     0.55   0.586    -.4968763    .8614638
     lninfra |   .2636609    .116155     2.27   0.032     .0249009     .502421
lnCorruption |  -.3911523   .7172154    -0.55   0.590     -1.86541    1.083105
        lnFDI |   1.151818   .6975876     1.65   0.111    -.2820934     2.58573
literacyra~s |   .0264072   .0215019     1.23   0.230    -.0177906    .0706049
  population |  -4.31e-09   5.25e-09    -0.82   0.419    -1.51e-08    6.49e-09
       _cons |  -5.781455   9.304626    -0.62   0.540    -24.90739    13.34448
-------------+---------------------------------------------------------------
      rho_ar |  .00361458
     sigma_u |  1.5513056
     sigma_e |  .89004024
     rho_fov |  .75234737   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(13,26) =     0.96                 Prob > F = 0.5099
```

Impact of FDI on regional domestic product

On examining the interaction effect of log naturals of NSDP and FDI in states with corruption index of more than 103.3, product of FDI and dummy yielded significantly positive coefficient of 1.038. These observations were significant at 5percent levels with a t value of 2.16.

```
-> dummy = 1
note: lnFDI omitted because of collinearity

FE (within) regression with AR(1) disturbances  Number of obs      =        39
Group variable: ID                              Number of groups   =        13

R-sq:  within  = 0.3588                         Obs per group: min =         1
       between = 0.3662                                        avg =       3.0
       overall = 0.1977                                        max =         4

                                                F(5,21)            =      2.35
corr(u_i, Xb)  = -0.7169                        Prob > F           =    0.0764

------------------------------------------------------------------------------
       lnNSDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
    lngovtexp |  -.4401405    .507976    -0.87   0.396    -1.496534    .6162535
     lninfra |  -.1613629   .1862889    -0.87   0.396     -.548772    .2260461
    dummyFDI |   1.038293   .4798856     2.16   0.042     .0403166     2.03627
        lnFDI |  (omitted)
literacyra~s |  -.0253241   .0345788    -0.73   0.472    -.0972346    .0465865
  population |   1.62e-08   1.95e-08     0.83   0.417    -2.45e-08    5.68e-08
       _cons |   1.887668   5.680441     0.33   0.743    -9.925456    13.70079
-------------+---------------------------------------------------------------
      rho_ar |  -.20476203
     sigma_u |   1.2130946
     sigma_e |     1.63994
     rho_fov |   .3536645   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(12,21) =     0.59                 Prob > F = 0.8266
```

The impact of regional domestic product on FDI was also estimated for states with corruption index of less than 103.3 and the coefficients of FDI were positive and not significant.

```
-> dummy = 0

FE (within) regression with AR(1) disturbances  Number of obs      =        46
Group variable: ID                              Number of groups   =        14

R-sq:  within  = 0.2227                         Obs per group: min =         1
       between = 0.8430                                        avg =       3.3
       overall = 0.6826                                        max =         4

                                                F(5,27)            =      1.55
corr(u_i, Xb)  = -0.8441                        Prob > F           =    0.2088

------------------------------------------------------------------------------
      lnNSDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   lngovtexp |   .2036559   .3293066     0.62   0.541    -.4720254    .8793372
     lninfra |   .2456055   .1140413     2.15   0.040      .011612     .479599
       lnFDI |   .8384941   .6408344     1.31   0.202    -.4763894    2.153378
literacyra~s |   .0249426   .0214496     1.16   0.255    -.0190684    .0689536
  population |  -4.90e-09   5.19e-09    -0.94   0.354    -1.55e-08    5.75e-09
       _cons |  -5.564435   8.679144    -0.64   0.527    -23.37257     12.2437
-------------+----------------------------------------------------------------
      rho_ar |  .01546507
     sigma_u |  1.1910279
     sigma_e |  .88937864
     rho_fov |  .64200978   (fraction of variance because of u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(13,27) =     1.09                 Prob > F = 0.4085
```