IS CHINA DIFFERENT? A META ANALYSIS OF THE EFFECT OF FOREIGN DIRECT INVESTMENT ON DOMESTIC FIRMS

Christer Ljungwall and Patrik Gustavsson Tingvall
Stockholm School of Economics

Working Paper 2
November 2008

Postal address: P.O. Box 6501, S-113 83 Stockholm, Sweden.
Office address: Holländargatan 30 Telephone: +46 8 736 93 60 Telefax: +46 8 31 30 17
E-mail: japan@hhs.se Internet: http://www.hhs.se/cerc

Is China Different?
A Meta analysis of the effect of foreign direct investment on domestic firms

Christer Ljungwall and Patrik Gustavsson Tingvall
Stockholm School of Economics[*]

Abstract: Empirical evidence suggests that China has benefited from foreign direct investment (FDI). However, an important question that remains unanswered is whether China has benefited more from FDI than other countries in general and other transition and developing countries in particular. This paper investigates this issue by performing a Meta-analysis on a sample of 67 country-specific studies yielding 125 observations that have gauged the nexus between FDI and measures of income growth. The results show that studies on China report relatively high *t*-values and thus indicate that China may have benefited more than other countries from FDI.

Keywords: Meta-analysis; Foreign direct investment; Economic growth; China
JEL classification: F21; F23

[*] Stockholm School of Economics, China Economic Research Center (CERC). P.O. Box 6501, SE-113 83 STOCKHOLM, Sweden. E-mail: christer.ljungwall@hhs.se and patrik.gustavsson@hhs.se

1. Introduction

From having been an almost closed economy, China started to accept foreign direct investment into so-called special economic zones (SEZ) in 1978. There was no immediate flood of investments and until 1991, the annual flow of FDI as a share of GDP remained at less than one percent. However, after Deng Xiaoping's "Southern Tour" in 1992, the FDI inflow into China boomed and despite a post reform average growth rate of real GDP in the neighborhood of ten percent, there was an increase in the share of FDI inflow to GDP and in 1995-2005, it reached 3-5 percent of GDP. To get some perspective, a comparison may be in place. In 2004, the stock of inward FDI as a share of GDP was 18 percent for China as compared to only 1 percent for Japan, 44 percent for the South-east region, 26 percent for the European Union and 13 percent for the United States. Hence, FDI flows vary significantly across regions and countries.

It has been argued that FDI has both worked as a catalyst for Chinese exports and as a vehicle for technology transfers. In addition, FDI has brought in organization and management practices as well as contributed to increase the level of competition in the Chinese economy, all of which contribute to economic growth.[2] Therefore, it is not surprising that few areas of research have evoked more interest and debate than the study of the nexus between FDI and income growth. In addition, the recognition that policies designed to attract FDI can spur a country's economic growth, in particular in the early stages of economic development or in economies transiting from a planned to a market economy, has made China a particularly interesting object of study.[3]

Empirical evidence shows that China has benefited from the massive inflow of FDI. Nevertheless, a comparison of results across countries indicates a lack of consensus of the impact of FDI on the host economy: Some studies find positive effects of FDI on productivity, other studies find negative or no effects at all. In addition, the results vary even for single

[2] See e.g. Naughton (2006).
[3] For a survey of how FDI may affect the host country, see e.g. Aitken and Harrison (1999), Konings (2001) and Fan (2002).

countries. One reason why such controversy exists may be attributable to differences in research design, methodology and data which may all have a direct impact on the results obtained.[4]

We scrutinize the mixed evidence by conducting a Meta-analysis of the literature on FDI and productivity covering a large number of countries at different stages of development. This leads to the specific objective of this paper, i.e., to investigate whether China is different as compared to other countries in terms of how it is affected by FDI. Our analysis has become possible due to the significant expansion of the literature on FDI and various measures of growth. In comparison, our sample consists of 67 studies yielding a maximum of 132 observations which can be compared to other meta-analyses on FDI and growth including Görg and Strobl (2001) who utilized 21 studies that yielded 25 observations and Diebel and Wooster (2006) who gathered 32 studies yielding 141 observations. Hence, our sample covers more than twice as many studies as any other available meta-analysis on FDI and growth, which contributes to both increased generality and stability of our results.

The use of Meta-analysis is particularly convenient for summarizing, and explaining, variations and results of a number of empirical studies concerned with a particular research topic (Stanley and Jarell, 1989)[5]. To be more exact, a meta-analysis allows us to quantify and unfold trends in the empirical results that would otherwise be difficult to detect. This paper is the first of its kind with specific attention to China.

The rest of the paper is organized as follows. Section 2 discusses the data sources, the model specification and the variables used in the Meta-analysis. The next section presents the results and, finally, section 4 provides some concluding remarks.

[4] See e.g. Görg and Stroble (2001).
[5] Following the influential work by Phillips (1994); Phillips and Gross (1995); Card and Krueger (1995); Smith and Huang (1995); Stanley (1998); Ashenfelter et al. (1999); Gorg and Strobl (2001); Mookerjee (2006), the use of Meta-analysis has been increasingly applied in economics. Wooster and Diebel (2006) use a slightly different methodology.

2. Model specification data, and variables

Following the lead of Card and Krueger (1995), Görg and Strobl (2001) and, more recently, Diebel and Wooster (2006), we perform a meta-analysis using a sample of 67 country-specific studies that explore the link between FDI and various measures of income growth. For each study, we collect the *t*-statistic of the coefficients for the FDI variable. The *t*-statistic variable is then regressed on several study characteristics that are meta-independent and presumed to influence the outcome of the study.[6] The following regression is estimated using OLS and constitutes the point of departure of our meta-regression analysis:

$$Y_i = \alpha_0 + \sum_{k=1}^{K} \alpha_k X_{ik} + \varepsilon_i \qquad i = 1, 2 \ldots\ldots N$$

where Y_i is the reported '*t*' statistic estimate in study i, and X_{ik} are the meta-independent variables which have the characteristics of the empirical studies in the sample, so as to explain the variation in the Y_i across studies in the sample.

Following Stanley and Jarrell (1989), and motivated by the fact that differences in the measurement of FDI affect the magnitude of the coefficients, we use *t*-statistic as a dimension-less dependent variable.[7] This, in turn, provides us with a standardized measure of the effect of the FDI variable on the dependent variable, which allows for cross-study comparisons. To improve the precision in the analysis and to handle the hierarchical structure of the model with country- and possibly study-specific clustering, we estimate country clustered- and subsequently multi-level models using a two-way crossed random effects model (country and study), which takes into account the hierarchal structure of the data (see Raudenbush (1993).

2.1 Data and variables

The papers used in this study were drawn from 67 studies on FDI and growth; see Table A1 in the Appendix for a listing of studies included. The 67 papers yielded a maximum of 132

[6] Stanley and Jarrell (1989) named these technique 'meta-regression' analyses.
[7] The *t*-statistic can take on both positive and negative values.

observations out of which seven outliers have been removed.[8] The papers were obtained after a search using electronic databases of published and working papers, such as *Econlit* and *Google Scholar* with a keyword listing such as "FDI, productivity, economic growth, spillovers". Studies with no reported *t*-statistic for the FDI variable, or because the paper was cross-country, are not included in this the study. As seen in Table A2 in the Appendix, the distribution of *t*-values for China is shifted toward higher values than for other countries. The question is whether these seemingly high t-values can be explained by way of data and research design and whether the difference is significant.

Our comparably large sample allows us to include a large number of meta-independent variables and it is not specifically constrained to problems related to inadequate degrees of freedom, a problem observed among previous studies using much fever observations. Economic theory does not provide any direction as to the choice of explanatory variables to be included in the estimations and instead we lend support from the vast literature. The variables included are: Measure of FDI, the response variable (output or productivity in levels or growth rate) and control variables included in the regression (capital, labor quality, industry, firm and time dummies).

Countries are grouped into five categories accruing to the FTSE country classification index[9]. To be precise, we include country-specific dummies indicating whether the country is developed, advanced emerging, secondary emerging, frontier or developing. This does not only allow us to analyze whether China has benefited more from FDI than countries in general but also whether China deviates in a comparison with countries at the same level of development. To take account of differences in sample size, we include the log of the square root of the degrees of freedom in the analysis (see Görg and Stobl, 2001 and Makoorjee, 2006).

3. Empirical results

Table 1 reports the results of the Meta-regression analysis. The dependent variable for all nine equations is the *t*-statistic for FDI. The estimations are conducted in a step-wise manner.

[8] *t*-values > 8.
[9] Financial Times Stock Exchange, http://www.ftse.com/Indices/Country_Classification/index.jsp.

Columns 1-2 constitute a basic model taking into account only the China-dummy and meta-independent control variables: degrees of freedom (dgf), type of data, measure of FDI, impact variable (output or productivity), capital and human capital composition. The estimates in column 1 are estimated by way of OLS and with clustering with respect to country. Column 2 allows for a two-way crossed random effects model with respect to country and study, thus dealing with the more complex structure of the data, i.e., it accounts for hierarchical structures. In columns 3-4, we add country type dummies and in columns 5-6, we also control for period-, industry- and fixed effects.

The results show that China is not sensitive to model specifications. The estimated coefficient for China remains robustly positive significant at the five-percent level or more through all regressions implying that FDI has been comparably beneficial for Chinese economic growth. To be precise, the positive coefficient for China in columns 1-2 signals that FDI has lead to a more positive significant impact on measures of income and growth than for other countries in general. However, it is well known that the evidence on the impact of FDI across countries is mixed. Therefore, it is interesting to notice that the estimates for China in columns 3-6, where we control for the degree of development of the countries, remain positive and significant. Hence, even in comparison with countries at the same level of development, the impact of FDI has been relatively positive and significant for China.

Comparing country groups (results not presented), we see that the significant estimate seems absent for our country group definitions.[10] Hence, having developed countries as a benchmark, we do not find any significant difference in the impact of FDI on measures of income and growth between rich developed countries and countries at a lower level of development. Further, including additional model-specific control variables into the analysis does not alter the results on China.

[10] Results available upon request.

Table 1. Meta-regression analysis, Dependent variable: t-statistic

	Basic model OLS, Cluster	Basic model Multilevel	Md. Model OLS, Cluster	Md. Model Multilevel	Full model OLS, Cluster	Full model Multilevel
China dummy	1.980 (0.594)*** [0.534] ***	1.977 (0.665) ***	2.053 (0.698) *** [0.810] ***	1.976 (0.783) ***	1.657 (0.743) *** [0.805] ***	1.695 (0.837) **
lnγ_{DGF}	0.200 (0.165) [0.132]	0.257 (0.207)	0.218 (0.174) [0.145]	0.280 (0.219)	0.183 (0.238) [0.238]	0.154 (0.275)
Cross-section data	1.726 (2.490) [1.366]	1.706 (2.589)	1.646 (2.642) [1.555]	1.775 (2.755)	2.603 (2.586) [1.520] *	2.626 (2.697)
Panel or TS data	1.127 (2.393) *** [0.285] ***	1.026 (2.477)	1.029 (2.541) [0.705]	1.033 (2.641)	1.389 (2.476) [0.687] **	1.297 (2.564)
FDI/L	-0.553 (0764) [0.803]	-0.829 (0.827)	-0.517 (0.785) [0.823]	-0.853 (0.852)	-1.047 (0.787) [0.731]	-1.238 (0.851)
FDI/assets	0.139 (0.837) [0.534]	-0.177 (0.949)	0.117 (0.882) [0.625]	-0.322 (1.00)	0.512 (0.881) [0.570]	0.171 (0.989)
FDI/sales	-0.758 (0.560) [1.110]	-1.106 (0.652) *	0.736 (0.586) [1.219]	-1.176 (0.684)*	-1.179 (0.589) ** [1.078]	-1.461 (0.670) **
Growth in Productivity or output	0.412 (0.543) [0.543]	-0.571 (0.599)	0.423 (0.556) [0.563]	-0.835 (0.616)	0.346 (0.559) [0.610]	-0.034 (0.603)
Capital dummy	-0.626 (0.510) [0.405]	-0.850 (0.608)	-0.562 (0.537) [0.504]	-0.870 (0.641)	-0.861 (0.535) [0.513]	-1.051 (0.618) *
Lab. quality dummy	-0.845 (0.488) * [0.384] **	-0.671 (0.566)	-0.851 (0.521) [0.415] **	-0.622 (0.595)	-0.979 (0.510) * [0.418] **	-0.763 (0.575)
Industry dummy	no	no	no	no	0.323 (0.836) [0.751]	0.416 (0.866)
Period dummy	no	no	no	no	-1.171 (0.801) [0.589] *	-1.029 (0.826)
Developing country			-0.284 (0.868) [0.790]	0.047 (0.944)	-0.897 (0.859) [0.771]	0.090 (0.927)
Frontier country			-0.302 (0.876) [0.831]	0.419 (0.983)	-0.704 (0.897) [0.935]	-0.103 (0.991)
Sec. emerging country			-0.332 (0.613) [0.701]	-0.018 (0.679)	-0.324 (0.601) [0.565]	-0.049 (0.670)
Adv. emerging country			-0.708 (1.021) [1.028]	-0.434 (1.152)	-1.029 (1.022) [1.09]	-0.665 (1.133)
FE-control	no	no	no	no	1.840 (0.682)*** [0.609] ***	1.726 (0.768) **
Constant	0.467 (2.431) [0.548]	0.874 (2.504)	0.721 (2.608) [0.693]	0.828 (2.728)	0.642 (2.576) [1.039]	0.873 (2.673)
Obs.	125	125	125	125	125	125
R^2	0.179		0.184		0.252	

Notes: ***, **, * denote statistical significance at the 1%, 5% and 10% level, respectively. OLS standard errors in parenthesis (.) and country clustered standard errors within brackets [.]. Multilevel models are estimated as two-way crossed random effect models with respect to country and study of origin

Finally, Meta analysis data has a clear hierarchical structure suggesting the use of clustered standard errors or hierarchal models. We estimate models both with a control for clustered standard errors driven by the possibility that studies originating in the same country may have a common impact on estimates. Controlling for clustered standard error does not upset the results. A slightly more elaborated structure is allowed for in estimations 2, 4 and 6 where we estimate two-way crossed random effect models where we allow for random coefficients with respect to both country and study of origin. Once more, the positive and significant estimates on China remain unchanged. To illustrate the difference between studies, we estimated the implicated *t*-value for China and other secondary emerging economies using two different theoretical data sets. The first simulation assumes cross-section with FDI measured as the ratio FDI/Y and the response variable (output or productivity) in levels with control for capital intensity and 100 observations. With this set-up, the implicated *t*-value is 2.99 (1.06) for China (non-China secondary emerging countries). In the second simulation, we assume firm-level data with 5000 observations, the same set of control variables and FDI-measure, but we add a control for fixed effect. Givens this "typical" firm-level study assumption, the implied *t*-value is 2.39 for China and 0.46 for non-Chinese secondary emerging countries, respectively. Hence, it is beyond any doubt that FDI has had a more positive significant impact on China than other countries in the sample and we conclude in favor of the hypothesis that FDI has been an important component for overall economic growth in China.

4. Concluding remarks

Few areas of research have evoked more interest and debates in the last thirty years than the study of the nexus between FDI and various measures of income growth. This is due to a belief that FDI does not only generate jobs but also, by spillovers and other linkages, has the ability to spur economic growth, in particular in the early stages of economic development or in economies transiting from a planned to a market economy. Therefore, it is interesting to note that the empirical evidence is mixed. However, most studies on FDI and growth in China yield positive results. It is well known that study design and the data used have an impact on results

and it may therefore be argued that the positive results for China may be driven by the type of available data and methods used. This is a fundamental argument for using a Meta-analysis of whether the impact of FDI has been greater in China than in other comparable countries.

This study presents a quantitative review of the empirical literature on the effect of FDI on various measures of income growth which we utilize for a Meta-regression analysis consisting of 67 studies yielding 125 observations. In the analysis, we investigate whether China is different from other countries with respect to the effect of FDI. We find strong evidence that China differs markedly from other countries in this respect. More precisely, the included China dummy is positive and significant throughout a wide range of model specifications and insensitive to the inclusion of a set of country dummies controlling for the degree of development. The results are also robust with respect to the estimation procedure including country-specific clustered standard errors and two-way crossed random effects models with respect to country and study of origin. Hence, the results provide clear evidence suggesting that FDI has had a more positive significant impact on China than other comparable countries in the sample, pointing at FDI as a vehicle contributing to China's development.

References

Aitken BJ, Harrison AE. (1999). 'Do domestic firms benefit from direct foreign investment? Evidence from Venezuela'. *American Economic Review*, Vol. 89 No. 3, pp. 605-618.

Ashenfelter, O., C. Harmon, and H. Ooesterbeek. (1999). 'A review of estimates of the schooling earnings relationship with test for publication bias'. *Labor Economics*, Vol. 6, pp. 453-70.

Card, D., and A. Krueger. (1995). 'Time-series in Minimum-Wage Studies: A Meta-Analysis'. *American Economic Review*, 85(2): 238-243.

Diebel, D., and Wooster, R. (2006). 'Productivity Spillovers from Foreign Direct Investment in Developing Countries: A Meta-Regression Analysis'. Conference paper, Department of Economics, University of Arkansas, pp. 1-35.

Fan, X. (2002). 'Technological Spillovers from Foreign Direct Investment – A Survey'. ERD Working Paper Series No. 33, pp. 1-36.

Görg, H., and E. Strobl. (2001). 'Multinational Companies and Productivity Spillovers: A Meta-Analysis with a Test for Publication Bias'. *The Economic Journal*, 111(475): 723-739.

Konings, J. (2001). 'The Effects of Foreign Investment on Domestic Firms: Evidence from Firm level Panel Data in Emerging Economies'. *Economics of Transition*, 9, (3).

Mookerjee, R. (2006). 'A meta-analysis of the export growth hypothesis'. *Economics Letters*, 91: 395-401.

Naughton, B., (2006). The Chinese Economy, Transitions and Growth. The MIT Press, Cambridge Massachusetts, London England.

Phillips, J,M. (1994). 'Farmer education and farmer efficiency: a meta-analysis'. *Economic Development and Cultural Change*, Vol. 43, pp. 149-55.

Phillips, J,M., and E. P. Gross. (1995). 'The effect of state and local taxes on economic development: a meta-analysis'. *Southern Economic Journal*, Vol. 62, pp. 320-33.

Raudenbush, S.W. (1993). 'A Crossed Random Effects Model for Unbalanced data with Applications in Cross-sectional Longitudinal Research'. *Journal of Educational and Behavioral Statistics*, Vol. 18, No. 4, pp. 321-349.

Stanley, T.D. (1989). 'New wine in old bottles: a meta-analysis of Ricardian equivalence'. *Southern Economic Journal*, Vol. 64, pp. 713-27.

Smith, V.K., and J. Huang. (1995). 'Can markets value air quality? A meta-analysis of hedeonic property value models'. *Journal of Political Economy*, Vol. 103, pp. 209-27.

Stanley, T.D., and S.B. Jarrell. (1989). 'Meta-regression analysis: a quantitative method of literature surveys'. *Journal of Economic Surveys*, Vol. 3, pp. 161-70.

Appendix

Table A1. Study Characteristics

Paper	Country	Dependent variable	Type of FDI	No. obs / study	Year span
Aitken & Harrison (1999)	Venezuela	TFP-growth, TFP-level, Y-growth, Y- level	FDI/Sales	3	1976-1989
Mullen & Williams (20056)	USA	Lp-growth, Lp-level	FDI/Sales	4	1977-1997
Salehizadeh (2005)	USA	TFP level, Y-growth	Other FDI	2	1980-2003
Archanun (2003)	Thailand	Y-growth	Other FDI	1	1970-1999
Obwona (2001)	Uganda	Y-growth	Other FDI	1	1981-1995
Bende-Nabende *et. al*. (2001)	Indonesia	Y-growth	Other FDI	4	1970-1996
Zhang (2001)	China	Y-growth	Other FDI	3	1984-1988
Kathuria (2002)	India	TFP-growth	FDI/Sales	1	1989-1997
Kokko *et al*. (1996)	Uruguay	Lp-growth	FDI/Sales	1	1988-1990
Yao (2006)	China	Y-level	Other FDI	1	1984-2000
Sjöholm (1999)	Indonesia	Lp-level	FDI/Sales	3	1980
Giorgioni *et al.* (2006)	China	Y-level	Other FDI	1	1985-1999
Lee & Tan (2006)	Indonesia	Y-growth	Other FDI	4	1990-2000
Asheghian (2004)	USA	Y-growth	Other FDI	3	1960-2000
Tian *et al.* (2004)	China	Y-growth	FDI/Empl	1	1985-2000
Kozlov *et al*. (2003)	Russia	Lp-level	Other FDI	1	1993-1997
Buckley *et al*. (2004)	China	Lp-level	FDI/Empl	2	1995
Blalock & Gertler (2002)	Indonesia	Y-growth	FDI/Sales	1	1988-1996
Thuy (2007)	Vietnam	Lp-level	FDI/Empl	2	1995-1999
Thangavelu & Pattnayak (2006)	India	Y-level	Other FDI	1	1989-2000
Sinani (2004)	Estonia	Y-growth	FDI/Empl	3	1994-1999
Vinish (2001)	India	TFP-level	FDI/Sales	1	1976-1989
Blomström & Sjöholm (1998)	Indonesia	Lp-level	FDI/Sales	1	1991
Berthélemy & Démurger (2000)	China	Y-growth	Other FDI	1	1985-1996
Blin & Ouattara (2004)	Mauritius	Y-growth	Other FDI	2	1975-2001
Eventt & Voicu (2001)	Czech Rep	TFP- level	Other FDI	1	1992-1998
Kokko (1996)	Mexico	Lp-level	FDI/Empl	1	1970
Girma *et al*. (2008)	U. K	Y-growth	Other FDI	5	1992-1999
Khaliq (2007)	Indonesia	TFP- level	Other FDI	4	1998-2006
Marwah & Tavakoli (2002)	Indonesia	TFP-level	Other FDI	4	1976-1998
Hu & Tong (2003)	China	Lp-level	FDI/Empl	4	1995
Archanun (2005)	Thailand	Lp-level	FDI/Sales	1	1993-1999
Smarzynska (2002)	Lithuania		Other FDI	2	1996-2000
Marin & Narula (2005)	Argentina	Lp-growth	FDI/Empl	1	1998-2001
Haskel *et al*. (2007)	U.K	Y-growth	FDI/Empl	1	1973-1994
Banga (2001)	India	Lp-level	FDI/Ass	2	1993-2000
Marcin (2007)	Poland	Y level	Other FDI	3	1996-2003
Kokko (1994)	Mexico	Lp-level	FDI/Empl	1	1970
Driffield *et al*. (2002)	U.K	Y-level	Other FDI	4	1983-1992
Konings (2001)	Bulgaria	Y-level	FDI/Sales	3	1993-1997
Chandran & Krishnan (2008)	Malaysia	Y-growth	Other FDI	1	1970-2003

Table A1. Study Characteristics (continued).

Globerman (1979)	**Canada**	**Y-level**	**FDI/Sales**	**1**	**1972**
Crespo et *al.* (2002)	Portugal	Lp-level	FDI/Ass	1	1996-1998
Bwalya (2006)	Zambia	Y-growth	FDI/Empl	3	1993-1995
Bende-Nabende & Ford (1998)	Taiwan	Y-growth	Other FDI	1	1959-1995
Akinlo (2004)	Nigeria	Y-growth	Other FDI	1	1959-1995
Meyer & Sinani (2004)	Estonia	Y-growth	FDI/Empl	3	1970-2001
Liu (2008)	China	TFP-level	FDI/Ass	1	1994-1999
Bolbol & Sadik (2001)	Oman	Y-level	FDI/Sales	6	1995-1999
Fedderke & Romm (2006)	S. Africa	Y-growth	Other FDI	1	
Dimelis (2005)	Greece	Y-level	FDI/Ass	1	
Sun & Parikh (2001)	China	Y-growth	FDI/Sales	3	1986-1996
Shujie (2006)	China	Y-level	Other FDI	1	1978-2000
Madariaga & Poncet (2007)	China	Y-growth	Other FDI	2	1990-2002
Wen (2007)	China	Y-growth	Other FDI	1	1995-2001
Zhao & Du (2007)	China	Y-growth	Other FDI	1	1985-2003
Stehrer & Woerz (2005)	Italy	TFP growth	Other FDI	10	1981-2000
Baliamoune-Lutz (2004)	Marocco	Y-growth	FDI/Sales	1	1973-1999
Wen (2004)	China	Y-growth	FDI/Sales	1	1995-2001
Ayanwale (2007)	Nigeria	Y-level	FDI/Sales	2	1970-2002
Zhang (2006)	China	Y-growth	FDI/Sales	3	1992-2004
Zhang & Felmingham (2002)	China	Y-growth	Other FDI	1	1984-1998

Table A2. Distribution of t-values, percent.

	Non-China	**China**
Neg sign ***	4	4
Neg sign **	2	0
Neg sign *	1	0
Neg not sign	12	0
Pos not sign	24	7
Pos sign *	9	7
Pos sign **	11	19
Pos sign ***	37	63