New ESRI Working Paper　No.19

Economic impacts of surge in immigration in Japan from 2000-2009 - Bonus or onus?

Masahiro Omura

April 2011

内閣府経済社会総合研究所
Economic and Social Research Institute
Cabinet Office
Tokyo, Japan

（連絡先）総務部総務課 03-3581-0919 （直通）

Economic impacts of surge in immigration in Japan from 2000-2009 – Bonus or onus?

Masahiro Omura[1]

[1] Senior Research Fellow, Economic and Social Research Institute (ESRI), Cabinet Office. The author is grateful to the Center for Global Trade Analysis, Purdue University for allowing use of the GMig2 Data Base. Dr. Terrie Walmsley provided a kind support during the data preparation, which is greatly appreciated. The author also appreciates valuable comments provided by Mr. Shigeru Hotta, Dr. Mitsuo Hosen and other participants during the ESRI seminar on March 24, 2011.

Abstract

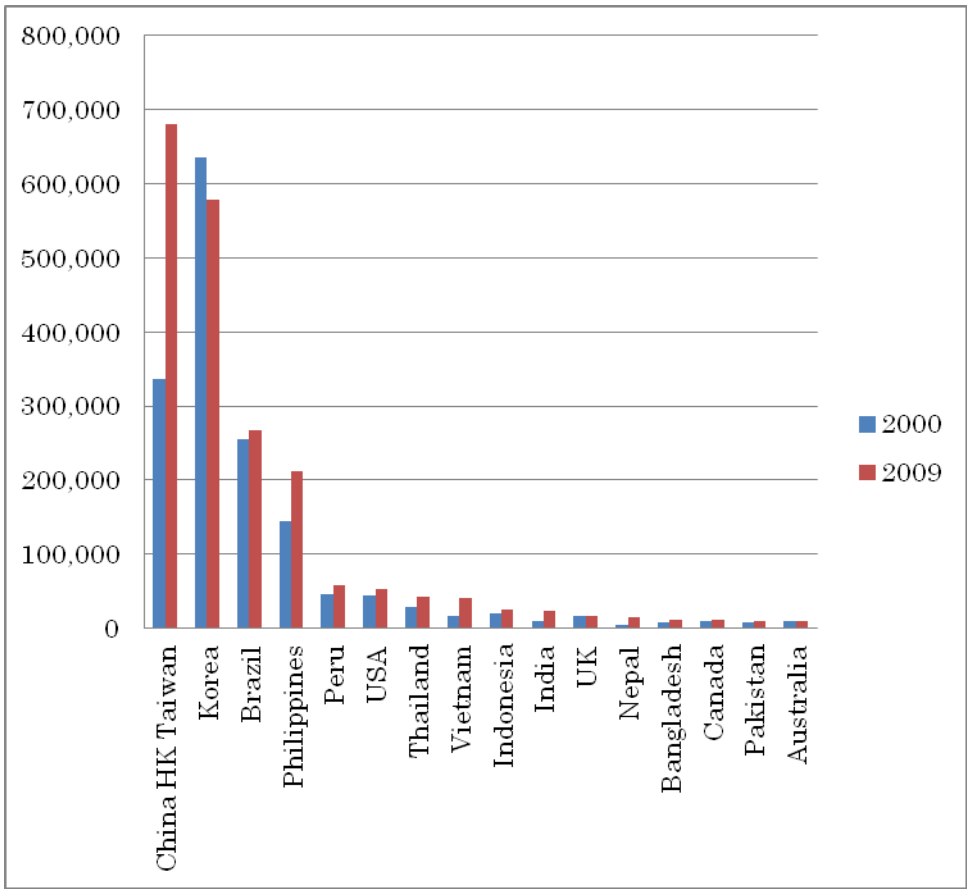
Foreign registered residents in Japan numbered 2,186,121 at the end of 2009, which is 30 percent larger compared to that in 2000. A recently developed CGE model, GMig2 model was employed to capture the effects of the surge with other factors controlled. The increase in foreign population boosted Japan's GDP by 0.16% without capital accumulation and by 0.24% with capital accumulation which is likely with a capital friendly shock such as the one under consideration. As to sectoral output, higher growth was observed in sectors relying on domestic market such as service sectors without capital accumulation. With capital accumulation export oriented sectors also showed stronger growth and improved the trade balance. Wages of native Japanese workers were affected negatively without capital accumulation, but such effects were neutralized with capital accumulation.

1. Introduction

During the last two decades the total number of registered foreign residents in Japan was more than doubled from 984 thousand in 1989 to 2,186 thousand in 2009. Before this surge, the Immigration Control and Refugee Recognition Act was amended in 1990. The categories of status of residence were expanded to promote legal immigration. After the revision, immigrants from Asia and of Japanese ancestry surged.

Traditionally special permanent residents comprised mainly of Korean nationals accounted for the majority of foreign nationals in Japan. In recent years the number of special permanent residents began to decline, and the number of foreign nationals newly coming to Japan for a variety of purposes has been increasing. In terms of nationality Koreans declined gradually, and Chinese increased rapidly to overtake the former in 2007 to be the largest in number among nationality groups.
This paper intends to investigate the economic impacts of increase of immigrants to Japan during the nine year period since 2000. Foreign registered residents in Japan increased by 30 percent from 1,686,444 in 2000 to 2,186,121 in 2009. During the same period nationality groups of foreign residents changed their size in various ways. Among the top 16 nationality groups, which have more than 10 thousand residents in 2009, Chinese, Filipinos, Thais, Vietnamese, Indonesians, Indians, Nepalese, Bangladeshis, and Pakistanis increased more than 30 percent. On the other hand, Koreans decreased by 9 percent.

Figure 1　Foreign population in Japan by nationality



Source: Japanese Ministry of Justice

2.　Questions to be asked in this paper

The US Council of Economic Advisors analyzed economic impact of immigration in 2007 and found the following as uncontroversial: immigration had fueled US macroeconomic growth; immigrant workers benefited from working in the United States.　It also found that effects on the well-being of US natives were more complicated and concluded that immigration had a positive effect on the income of native-born American workers.　"Immigrants increase the economy's total output, and natives share in part of that increase because of complementarities in

production." Complementarities in production originate from difference between natives and immigrants in terms of various characteristics related to production. [2]

A recent econometric study in Japan found that introduction of foreign workers had a positive effect on wages of native workers, and that inflow of foreign workers to a certain area may cause outflow of native workers from that area.[3]

As the CEA report mentioned above points out, it is not surprising that more total workers yield more total output. It would be of interest, however, to measure numerically impact on national output by a certain increase in foreign population in that country. It is also worthwhile to measure impact of migration on output of home countries of immigrants.

Another point to be examined is the impact on well-being of native workers. It would be interesting to obtain some numerical indication of such impact

A CGE model is employed to investigate these points. A simulation by a CGE model can extract an estimate of impacts of a shock, controlling other factors constant.

3. Framework of Analysis

A globally consistent database of bilateral migration, the GMig2 Data Base, together with the GMig2 model both developed by Walmsley et al., is employed with a kind permission from the Center for Global Trade Analysis, Purdue University. To measure the rate of change among the nationality groups, the alien registration statistics of Japanese Ministry of Justice is used.

The GMig2 Data Base is based on and consistent with the GTAP 6 Data Base. The GTAP Data Base has been used extensively in global CGE models. The GTAP 6 Data Base contains input-output data on 87 regions and 57 commodities, as well as detailed bilateral trade, transport and protection information. Parsons, Skeldon, Walmsley and Winters (2005) constructed a bilateral matrix of foreign born populations.[4] In addition to the GTAP 6 Data Base, this matrix data and other data

---

[2] Council of Economic Advisors, 2007, Immigration's Economic Impact
[3] Nakamura, Jiro, 2009, What is the outcome of introduction of foreign workers (in Japanese)
[4] Parsons, C. R., R. Skeldon, L. A. Winters and T. L. Walmsley (2005) 'Quantifying the

including ILO LABORSTA database were employed to construct a globally consistent database of bilateral population, labor by skill, wages and remittances.[5]

The GMig2 model is a global migration model with bilateral labor flows based on GTAP model[6]. It is a comparative static applied general equilibrium model. Labor force in the model comprises of domestic and foreign workers. Changes in labor forces are implemented as exogenous shocks. Foreign and domestic labor are treated as perfect substitutes. Labor supply is distributed across sectors to equate the percent changes in wages. Migrants' income depends on the income from their endowment of labor less remittances sent home. They are assumed to gain no income from ownership of capital or land, but migrants pay taxes.[7]

Among the top 16 home nations of immigrants mentioned above, Nepal and Pakistan are not treated separately in the GMig2 database and thus included in the rest of the world group. The regions identified for the simulation are the following 16 regions: AUS(Australia), CHT(China, Hong Kong, Taiwan), JPN(Japan), KOR(Korea), IDN(Indonesia), PHL(the Philippines), THA(Thailand), VNM(Vietnam), BGD(Bangladesh), IND(India), CAN(Canada), USA(United States), PER(Peru), BRA(Brazil), GBR(United Kingdom) and ROW(Rest of the World). The sectors are aggregated into the following 12 sectors: AFF(agriculture, forestry, fishery), LMP(livestock, meat product), MNG(mining), PFD(processed food), TXL(textiles, clothing), MTR(materials), TRN(transport equipment), ELM(electronic, machinery), XMN(other manufactures), UTC(utilities, construction), TRC(transport, communication), XSC(other services).

.

---

international bilateral movements of migrants', presented at the 8th Annual Conference on Global Economic Analysis, Lübeck, Germany, June 9-11.

[5] Walmsley, Terrie, Syud Amer Ahmed and Christopher Parsons, 2007, "A Global Bilateral Migration Data Base: Skilled Labor, Wages and Remittances", GTAP Research Memorandum No. 06

[6] Hertel, Thomas W. (Editor), 1997, Global Trade Analysis: Modeling and Applications

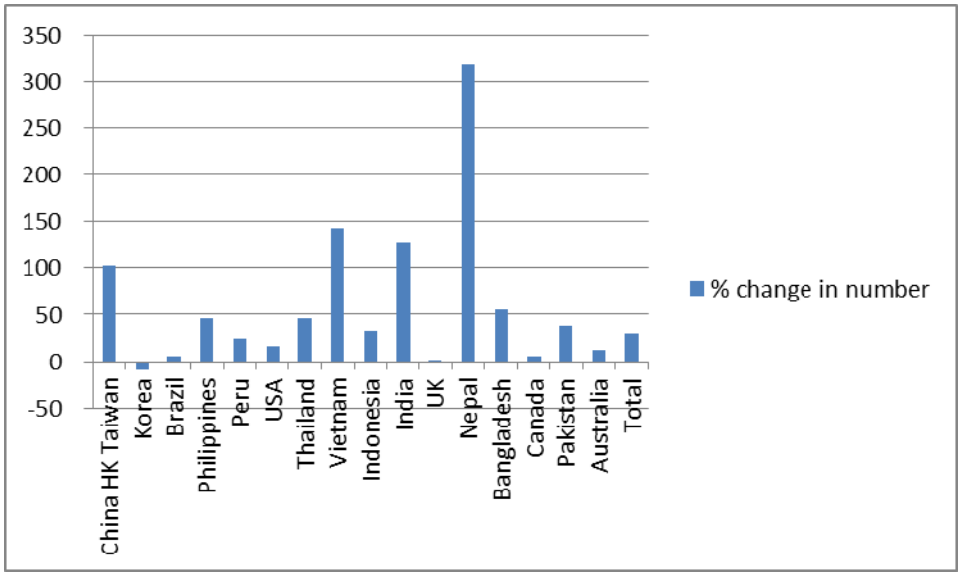
[7] Walmsley, Terrie, Alan Winters, Syud Amer Ahmed and Christopher Parsons, 2007, "Measuring the Impact of the Movement of Labour Using a Model of Bilateral Migration Flows" GTAP Technical Paper No. 28, Center for Global Trade Analysis, Purdue University

4. Simulation

4.1. The shock applied

The standard closure of the GMig2 model is employed with a modification to enable shocks which include varied rates of change in number of foreign labor force according to their home countries. A shock is designed to imitate the real change in number of foreign population residing in Japan among nationality groups between 2000 and 2009.

Table2　% Change from 2000–2009 of foreign population in Japan by nationality



Source: Japanese Ministry of Justice

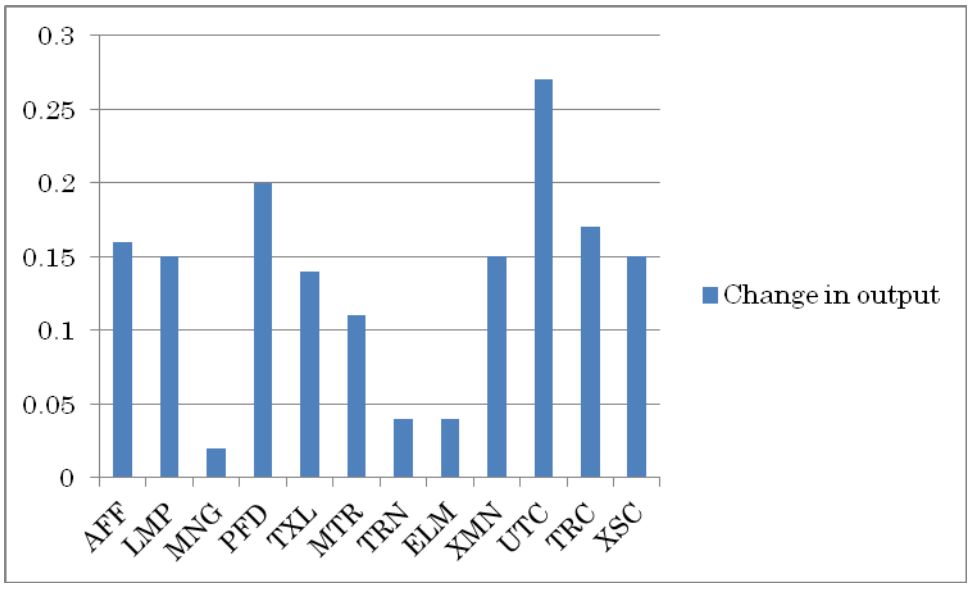
4.2. Impact on national output

According to the result of the simulation, the growth of immigrants during the nine years pushes up the Japanese GDP by 0.16% in volume.　The same changes in the home countries are mostly unnoticeable except in the Philippines, where the GDP volume declines by 0.03%.　In terms of change in welfare, Japan gains by 5,939 million dollars and dominates the worldwide gain of 6,421 million dollars.

According to the simulation, the output of all sectors in Japan increases.　Relatively

high growth is observed in the service sectors, PFD(processed food), XMN(other manufactures), while low growth in MNG(mining), TRN(transport equipment), ELM(electronic, machinery). MNG sector has the lowest share of labor in the sectoral value added, and thus benefits least from the increase in labor. Disappointing performance of TRN and ELM is due to their high export dependency. Increase in foreign labor results in increase in relative scarcity of non-labor endowment commodities and their prices. This causes increase in market prices of tradable commodities in Japan, and in their export prices. As a result Japanese exports lose competitiveness. TRN and ELM are the sectors affected most. Those sectors dependent almost entirely on domestic markets get benefit from the expansion of the domestic market. Japanese trade balance deteriorates by 1785 million dollars.

Figure 3 % Change in output by sector in Japan



Source: author's estimate

4.3. Impact on well-being of native workers without and with capital accumulation

The simulation result shows reduction in wage of unskilled labor by 0.06% and that of skilled labor by 0.1%, while rent for land and capital increase by 0.72% and by 0.12% respectively. In the simulation labor supply is shocked to expand and labor demand

is not shocked. The simulation is a one term static simulation which does not take capital accumulation into account. Capital accumulation, however, is likely with a capital friendly shock such as the one under consideration.

If capital accumulation is introduced into the simulation, the result looks different. As an approximation, capital accumulation in Japan is introduced in the simulation. The method taken is based on the theory by J.F.Francois et al. When a shock is capital friendly, induced investment may be greater than suggested by current saving rate. If the same amount of capital can produce more than before, part of the additional income will be saved and invested in new capital, which in turn yields an additional income gain. This is an induced gain.[8]

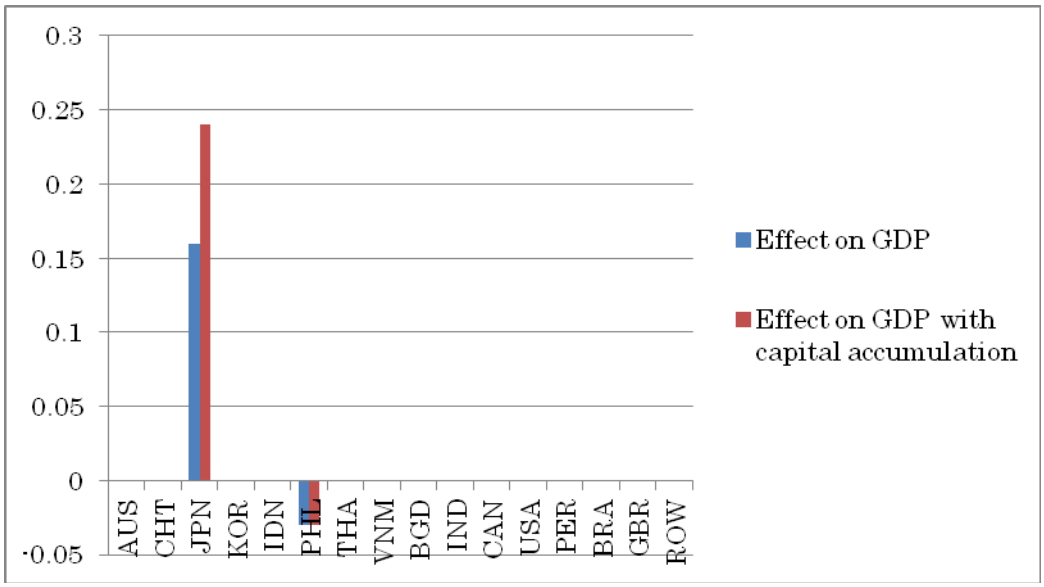
If the amount of capital stock is endogenized and allowed to expand, the rental rate on capital would not increase. This would stabilize wages. A simulation result with capital accumulation shows the change in the rental rate on capital would be 0%, that in wage of unskilled labor 0%, and that in wage of skilled labor −0.05%. This result is consistent with an econometric study by Nakamura (2009). Using microeconomic data the study by Nakamura concluded that the introduction of foreign labor to Japan does not have a negative effect on wages of native Japanese.

4.4. Simulation with capital accumulation

In the simulation with capital accumulation, GDP volume increases by 0.24% in Japan, decreases by 0.03% in the Philippines. The welfare gain is 7,777 million dollars in Japan (30.9% larger) and 8,793 million dollars in the world including Japan (36.9% larger). The output of export inclined sectors such as TRN and ELM increases in much higher rates in Japan. The Japanese trade balance improves by 745 million dollars.

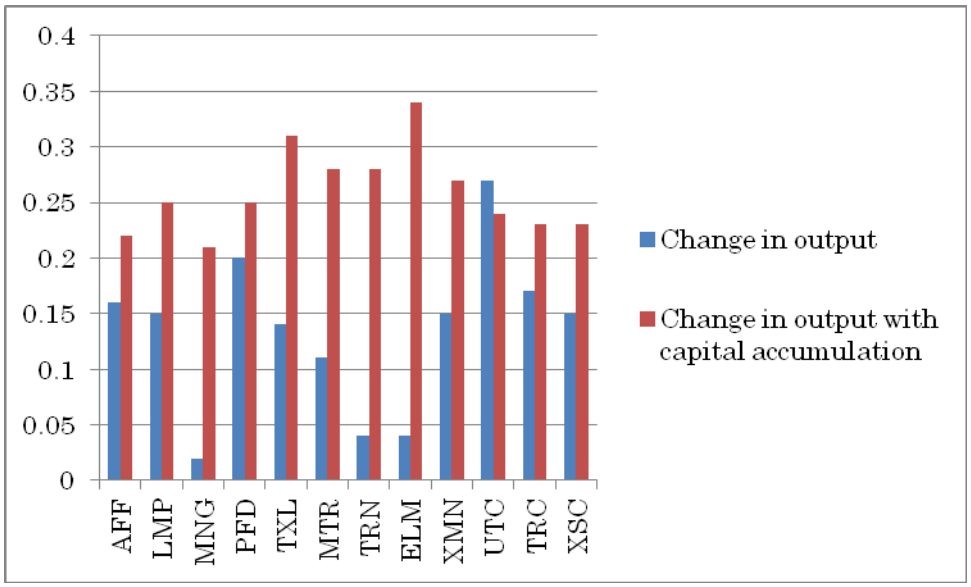
[8] Francois, Joseph F., Bradley J. McDonald and Håkan Nordström, 1996, Liberalization and Capital Accumulation in the GTAP Model, GTAP Technical Paper No. 7

Figure 4　Effect on GDP by region without and with capital accumulation（%）



Source: author's estimate

Figure 5　% Change in output by sector in Japan without and with capital accumulation



Source: author's estimate

5. Conclusion

This paper analyzed economic effects of a surge in immigration in Japan from 2000–2009. A recently developed CGE model, GMig2 model was employed to capture only the effects of the surge with other factors controlled. The increase in foreign population boosted Japan's GDP by 0.16% without capital accumulation and by 0.24% with capital accumulation which is likely with a capital friendly shock such as the one under consideration. As to sectoral output, higher growth was observed in sectors relying on domestic market such as service sectors without capital accumulation. With capital accumulation export oriented sectors also showed stronger growth and improved the trade balance. Wages of native Japanese workers were affected negatively without capital accumulation, but such effects were neutralized with capital accumulation.

Data and Model

GMig2 Data Base and Model, Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University

Reference

Council of Economic Advisors, 2007, Immigration's Economic Impact

Francois, Joseph F., Bradley J. McDonald and Håkan Nordström, 1996, Liberalization and Capital Accumulation in the GTAP Model, GTAP Technical Paper No. 7

Immigration Bureau, Ministry of Justice of Japan, Alien Registration Statistics

Immigration Bureau, Ministry of Justice of Japan, Immigration Control 2010,

Murakami, Eigo, 2010, Revisions of Immigration Control and Refugee Recognition Act and Industrial Training and Internship Program : Significance and Limitations (in Japanese)

Nakamura, Jiro, 2009, What is the outcome of introduction of foreign workers (in Japanese)

Sakai, Eshin , 2009, Increase of foreign residents and governments' responses (in Japanese), Hokkaido University Collection of Scholarly and Academic papers

Walmsley, Terrie, 2002, "Modelling the Movement of Natural Persons", Center for Global Trade Analysis Documentation

Walmsley, Terrie, Alan Winters, Syud Amer Ahmed and Christopher Parsons, 2007, "Measuring the Impact of the Movement of Labour Using a Model of Bilateral Migration Flows" GTAP Technical Paper No. 28, Center for Global Trade Analysis, Purdue University

Walmsley, Terrie, Syud Amer Ahmed and Christopher Parsons, 2007, "A Global Bilateral Migration Data Base: Skilled Labor, Wages and Remittances", GTAP Research Memorandum No. 06

Annex Tables

Table 1 Foreign population in Japan by nationality

	2000	2009
CHT	335,575	680518
Korea	635,269	578495
Brazil	254,394	267456
Philippines	144871	211716
Peru	46171	57464
USA	44856	52149
Thailand	29289	42686
Vietnam	16908	41000
Indonesia	19346	25546
India	10064	22858
UK	16525	16597
Nepal	3649	15255
Bangladesh	7176	11162
Canada	10088	10652
Pakistan	7498	10295
Australia	9188	10265
Total	1686444	2186121

Source : Ministry of Justice

Table 2 % Change from 2000–2009 of foreign population in Japan by nationality

CHT	103
Korea	−9
Brazil	5
Philippines	46
Peru	24
USA	16
Thailand	46
Vietnam	142
Indonesia	32
India	127
UK	0
Nepal	318
Bangladesh	56
Canada	6
Pakistan	37
Australia	12
Total	30

Source : Author

Table 3 Effect on GDP by region without and with capital accumulation(%)

c. a.	without	with
AUS	0	0
CHT	0	0
JPN	0.16	0.24
KOR	0	0
IDN	0	0
PHL	−0.03	−0.03
THA	0	0
VNM	0	0
BGD	0	0
IND	0	0
CAN	0	0
USA	0	0
PER	0	0
BRA	0	0
GBR	0	0
ROW	0	0

Source : Author

Table 4 % Change in output by sector in Japan without and with capital accumulation

c. a.	without	with
AFF	0.16	0.22
LMP	0.15	0.25
MNG	0.02	0.21
PFD	0.2	0.25
TXL	0.14	0.31
MTR	0.11	0.28
TRN	0.04	0.28
ELM	0.04	0.34
XMN	0.15	0.27
UTC	0.27	0.24
TRC	0.17	0.23
XSC	0.15	0.23

Source : Author