Evaluating the Scale of the Second Wave Brain Drain Initiative of Taiwan Graduates from Parents' Perspectives

Ying-Lung Liu
Doctoral student
National Taiwan University
Graduate Institute of National Development
Taiwan

Jih-Shine Chou
Professor
National Taiwan University
Graduate Institute of National Development
Taiwan

Abstract

Taiwan once faced a classic case of "brain drain". Despite of government restrictions, over 100,000 Taiwanese left to study abroad in the latter half of the twentieth century. The dual effects of Taiwan long-term economic stagnation and the impact from Beijing's preferential policy , called China 31 incentives , conducting the second wave brain drain initiative of high school graduates in Taiwan after 2018 spring. As a rule, parents' opinions are highly influential with high school students; this study aims to investigate the perspectives of 254 high school graduates' parents regarding their children's brain drain. It consists of three subscales -- push factors, pull factors with closed-ended scales, and open-ended scales concerning brain drain destinations preferences. Using exploratory factors analysis, we managed to construct factors structures; scale validity and reliability were significant. Total pull /push score ratios (BDR)were designed to indicate parents' approval extent of their children's brain drain.

Keywords: brain drain, exploratory factors analysis, second wave, push pull factor , scale

Introduction

Taiwan second wave brain drain initiative

Due to the stagnation of economic development in Taiwan, the external migration of manufacturers is growing more serious. 70 percent of young people under thirty-five years old make less than NT$40,000(US$1,333) a month (Liao, 2018). Urban housing prices are too high for young people to afford and they are pessimistic about their future prospects, so gambling to achieve a better future has become most Taiwan graduates' and parents' visions.Meanwhile, in February 2018, China has released favorable policies specially directed at Taiwan's young people (China 31 Incentives) (Norton, 2018). It has significantly reduced standards for applying China famous universities, alsolower tuition fees and same language advantages are actually encouraging most Taiwan high school graduates and their parents.The term "brain drain" was originally coined in 1963 when British academics and scientists emigrated to the United States (Andreas, 2007). Similarly, brain drain seemed the only way out for Taiwanese youth escaping from low-wage dilemma (Rickards, 2018). Today, with the promulgation of China 31 Incentives, studying abroad is no longer limited to the elites. Especially it has really encouraged middle and lower-class students and their parents to pursueforeign further education for better future. Thus, initiated the second wave brain drain in Taiwan.

The theory framework

The classic approach to migration is push-pull theory. This theory was proposed by Ernest Raven stein, who analyzed internal migration in England during 1870s. Raven stein believed that pull factors play a more critical role in migration than push factors. He also acknowledged that the most important factor motivating people to migrate is a desire to improve their lives rather than stick with disappointed original (Ravenstein ,1885). In terms of studying the causes of population mobility, "push-pull theory" is the most important macro-collection theory in demography. The first to propose this theory is D. J. Bagne (Dorigo , Tobler1983). Bagne believed that both the outflow and inflow land have both tension and thrust, and at the same time supplement the third factor: the intermediate obstacle factor.

The intermediate obstacles mainly include the distance, material barriers, language and culture differences, and the value judgments of the immigrants on these factors. Population mobility is the result of a combination of these three factors. Everett Lee further defined push factors to explain the impact factors that intervening obstacles have on the migration process. Factors such as distance, physical and political barriers also influence the willing of original migration(Everett, 1966). Lee also emphasized that the migration causing factors diversified as age, gender, and social class responded to people's push-pull factors of migration. Personal factors, such as school education, family and friend connection were also factors involved. The rapid change in the globalization and innovations in science and technology mean no more clear employment prospects for graduates in most disciplines(Clarke, 2008; Clarke &Patrickson,2008; Tomlinson, 2012).The pursuit of good life, and self–realization are being in demand have become common for everyone (Zhatkanbaeva, 2012). Globalization is manifested in the possibility of educational mobility (Zhatkanbaeva ,2012), Diversified learning and competition are keys to success in globalization. Accordingly, Mazzarol's research indicated six 'pull' factors found to influence student selection of a host country (Mazzarol, Kemp and Savery 1997).First is the pursuit of higher quality education and knowledge. Second is the outflow destination decision influenced by parents and relatives. Third is the expectation of lower tuition fees in the new country, fourth is assumed lower travel costs, fifth is anticipation of lower costs of living, and the last is the expectation of more job opportunities. Both push and pull factors are external forces which impact on graduates' behavior and choices; much also depends on the personal characteristics of the graduates. These may include socio-economic status, academic ability, gender, age, motivation, and aspiration (Mei Li, Mark Bray 2007). As to high school graduates, their parents' comprehensive influence stems from being more concerned than others.

Research purposes

Recently, Taiwan graduates are looking at options other than the United States for study abroad opportunities. Some of the main reasons are economical. In fact, the number of Taiwan graduates in the United States had been declining gradually ever since it peaked in the mid-1990s (Chen, 2016). Students from middle-class families are now more likely to consider options other than the United States to reduce the cost. With the economic outlook bleak, long-term wages lower, and housing prices soaring, causing most Taiwan youths worry about their future. After China31 Incentives policy announced on February 2018, the majority of Taiwan high school graduates who had never thought to leave, finally got the chance for further study. Since high school graduates haven't enough financial support and social experience, parents' prospects about outflow turned out to be the key factor. We noticed that applications from Taiwanese nationwide high school graduates to China's famous universities increased rapidly last year (Taipei Times, 2018) However, Taiwan ruling authorities have made a poor relationship with China, seeming to suppress the information related to graduates studying in China. The facts was that two Taiwan elite high school principals , Jianguo and Wuling high schools were interviewed by government inspectors last year just for their graduates' increasing applications to China colleges (China Times, 2018). Most of high school principals suddenly kept silent with any question regarding their graduates' applications to China colleges from that moment. So we designed the Brain Drain Scale to help more graduates aspiring to study abroad self-evaluation .

Research limitations

Since the Taiwan ruling authority continues being hostile towards China, most recruited high school principals hope there would be no negative description about domestic status quo. So, the push factors of the scale were limited to representations to evaluate graduates parents' perspectives. Therefore, the push factors must be modified and recoded to present the original intention.

Methods

This validation scale included four-part questionnaires--Part A, B and C were close-ended surveys: Part A included five items to recognize parents' backgrounds and BDR (Brain Drain Ratio) (see Table1).Part B comprised ten push factors items regarding parental approval for their children's brain drain. For meaning and clarity, we used a five-point Likert scale to classify parents' intensions and recode their exact meanings (5 =strongly agree,4 =somewhat agree, 3 =neutral, 2 =somewhat disagree, 1 =strongly disagree). Scale scores were analyzed with descriptive statistics rankings (Table 2a), and examined by Exploratory Factor Analysis(EFA), as interrelated identifying items (Yong, Pearce 2013)(see Table 2b).Part C has ten pull factors items of parental approvaloftheir children's brain drain. Scale scores were also analyzed with descriptive statistics rankings (see Table 3a), examined by Exploratory Factor Analysis(EFA), as interrelated identifying items (see Table 3b). We used a five-point Likert scale to classify parents' intensions and recoded them for their exact meaning. We also created a variable (BDR) to represent the intensions of parents who support their children's brain drain or migration. It consists of pull factors scores integrated A and push factors B, then A/B represent BDR. If the BDR is greater than one, means parents prefer kids to brain drain and vice versa.

Participants a total of 292 parents of high school graduates recruited in this scale validation. With high school directors' explaining the scale contents and purposes, class tutors recruit students' parents to participate this scale validation. Effective response scales were 254 (87 percent, 254 of 292). According to the research, questionnaires response rates range between 80 and 95 percent (Polit & Beck, 2008), which means this article is appropriate.

Instruments

A twenty five-item, close-ended scale and a two-item open-ended survey were developed based on literature review and consultation with three scholars and four high school counseling experts. We created a four-domain scale to validate high school parents' perspectives about their children's brain drain. Item A (one to five) was parents' background and characteristics, Item B (one to ten) was the brain drain push factors. Item C (one to ten) was the brain drain pull factors, and Item D (one to two) was two open-ended survey to confirm parents' recognition for their children's brain drain enthusiasm and destination. SPSS software (version 22.0) was provided for descriptive analysis, and t- test and one-way analysis of variance (ANOVA) were used to examine parents' background and Brain Drain Ratio (BDR) . Exploratory Factor Analysis (EFA) was used to reduce the items of this scale from 254 samples to four sub-constructs, to measure parents' psychological traits such as attitudes, motivations, and abstract concepts of intention. DeVellis suggests minimum of 150 samples for EFA(DeVellis, 2003). Scale Content Validity was provided by three professors and four high school experts, and derived from two subjects. Each one had a content suitability score from0.83 to 1 , and text clarity scores from 0.85 to 1 , indicating the scale appropriateness and significance. (Rubio, 2003)

Results

Part A Parents' background and characteristics

Table 1 shows that high school graduates parents' extent of preference about their children's brain drain. The Brain Drain Ratio (BDR) average is 1.30, indicating parent prefer their children's brain drain. We also found that lower education level (graduated from junior school) parents BDR average was2.1 , much higher than other levels; Monthly salaries above $ 3,500 have higher BDR average1.36 . Parents working at computer science jobs were the most support for kids to outflow than other careers, their BDR average was1.38 . Finally, we foundthat82.6 percent of parents had never studied abroad, but they still approved their children's brain drain. Their BDR average was 1.3 .

Part 2 Push Factors analysis

As Table 2a showed, the validity using EFA managed to extract two factors. Most researchers tend to include items with higher loadings (at least 0.5) into the final scale (Schaufeli et al, 2002).In our table showed, Factor 1 represents Host Socio cultural Advantages, and each item factor loading from 0.595 to 0.820 . Factor 2 represents Home Weak Economy compared with Host Merits, each item factor loading from 0.682 to 0.798 .For Exploratory factor analysis, the KMO value is0.847 , indicating the samples are adequate and significant ($p<0.01$)(Brace et al,2006); Cronbach's alpha value of factor 1 is 0.849and Factor 2 is0.831 , indicating a high level of internal consistency for a scale with these specific samples. According to the literature, the corrected item-total correlation should be at least 0.3 (Maltby 2007, Brzoska 2010),Table 2b showed item-total correlation value of Factor 1 from0.479 to0.678, Factor 2 is from0.345 to 0.560 , indicating the item appropriate for the construct. These two factors contributed a total58.89 percent of variance explained.

Part 3 Pull Factors Analysis

As Table 3a showed, the validity using EFA managed to extract two factors, Factor 1 represents Host Sociocultural Advantages, with each item factor loading from 0.764 to 0.796 . Factor 2 represents Home Weak Economy compared with Host Merits, and each item factor loading from 0.672 two to 0.828 . For exploratory factor analyses, most researchers tend to include items with higher loadings (at least 0.5) into the final scale(Schaufeliet et al, 2002). And these two factors which contributed a total 60.66 percent of variance explained. KMO value is 0.834 , indicating the sample is adequate and significant ($p<0.01$) (Brace et al,2006); Cronbach's alpha value of Factor 1 is 0.777and Factor 2 is 0.863 , which indicating a high level of internal consistency for the scale with these specific samples. According to literature, the corrected item-total correlation should be at least 0.3 (Maltby 2007, Brzoska 2010). Table 3b showed the item-total correlation value of Factor 1 was from 0.418 to 0.511 , forFactor 2 ,it was from 0.559 to 0.630 , which indicating the item appropriate for the construct.

Part 4 Open-ended survey parents' perspectives of Brain Drain destinations and pursuits

Our scale data showed (see Table 4) that United States was still parents' first choice for their children's brain drain (55.6 %). Apparently, China has upgraded to second place (10.8 %) than ever been since 2011. According to Taiwan Mainland Affairs Council 2017 data (MAC, 2019), there were 2,567 of 40,009 (6.4 %)

Taiwan graduates' studying in China ranked fifth in major study abroad countries. We also found that parents' expectation of their children' brain drain is to pursue better development (53.8 %) ranked first in all pursuit goals.

Conclusion

China's launch of its 31 Incentives policy in February 2018, included the relaxing of university qualifications, which led to more middle-level Taiwanese high school graduates qualifying for it. The move led to a surge of high school graduates wishing to study abroad that initiative Taiwan' the second wave brain drain. Considering the significant impact of parents on their high school graduates, our study collected the opinions of 254 parents of high school graduates from different areas of Taiwan and validated their perspectives of children's brain drain. We also created a BDR index to show parents how they are supporting children to study abroad. By designing open-ended questions to document parents' ideas for students studying abroad. The study shows that most of parents participants'(209 of 254, 82.3%) BDR indices were greater than one , which meant that the scale was able to accurately measure the parents' perspectives of brain drain. The scale analysis findings showed that the percentage of variance explained were 58.89 percent for push factors, 60.66 percent for pull factors, which indicated a stronger variances association for better predictions (Rosenthal, 2011); Cronbach's αvalue for push factors is 0.831 and 0.849, and pull factors is 0.777 and 0.863. Usually Cronbach's αvalue above 0.8 indicates a higher internal consistency of the scale. This scale KMO values for push factors was 0.847, pull factors 0.834. The literature revealed that KMO values between 0.8 and 1, indicated the sampling was adequate. This scale is apparently suitable for validating parents' perspectives of their children's brain drain. Meanwhile we are monitoring the consequences of the Taiwan Second Wave Brain Drain Initiative.

Table 1Parents' background & characteristics and approval BDR (N=254)

Variable	N%	BDR Mean	F (T) P
Gender F=1.657 0.199			
Male	110	43.3%	1.3009±0.345 T=0.164
Female	144	56.7%	1.3080±0.343
Wages ($)F=0.490 0.689			
>3500	41	16.1%	1.3595±0.407
2000--3500	83	32.7%	1.2802±0.301
1000--2000	58	22.8%	1.3013±0.326
<1000	72	28.4%	1.3228±0.403
Education F=3.06 0.018*			
Ph.D	16	6.3%	1.2265±0.292
Master	59	23.2%	1.3093±0.305
Bachelor	127	50.0%	1.3085±0.335
High school	50	19.7%	1.2840±0.326
Junior school	2	0.8%	2.1000±1.555
Career F=0.427 0.943			
Gov. employee	50	19.7%	1.2654±0.3265
Financial	68	26.8%	1.3293±0.3838
Accountant. lawyer	5	2%	1.3684±0.5138
Service	59	23.2%	1.3550±0.3820
Medical care	13	5.1%	1.2159±0.3303
Computer	16	6.3%	1.3804±0.2838
Commercial	18	7.1%	1.2507±0.3134
Retirement	25	9.8%	1.2606±0.4037
Abroad experience F=0.507 0.771			
Never study abroad	210	82.6%	1.2987±0.327
Outflow then back work	30	11.8%	1.3088±0.447
Outflow then work abroad	12	5.6%	1.2127±0.380

Table 2a Exploratory Factors Analysis of the Parents' Push Factors (N=254)

Factor 1: Home effective institutions (Item 1.2.3.4.5.10)

Factor 2: Home well living conditions (Item 6.7.8.9)

Item Content	Mean	SD	Fac1	Fac2
Factor 1 Home effectiveinstitutions			**loading**	**loading**
2. Domestic optimistic economics	2.62	0.978	**0.820**	0.159
4. Domestic reasonable labor rights	2.76	0.942	**0.772**	0.235
1. Domestic university excellent quality	3.28	0.875	**0.752**	0.033
3. Domestic stable politics	2.71	0.990	**0.743**	0.304
5. Domestic fair progression system	2.80	0.976	**0.720**	0.127
10. Domestic well innovation environment	3.25	0.970	**0.595**	0.229
Factor 2 Home well living			**loading**	**loading**
8. Social stability & well public order	3.44	0.975	0.228	**0.798**
6. Domestic health insurance system	3.98	0.834	0.033	**0.777**
7. Domestic stabilized goods selling price	3.19	1.017	0.222	**0.727**
9. Familiar learning & employment	3.75	0.893	0.250	**0.682**
Sum of squared loading (Eigenvalue)			4.267	1.631
Percentage of variance explained(%)			42.67	16.31
Cumulative percentage of variance (%)			42.67	58.89
Cronbach'α			0.849	0.831
KMO =0.847				

Table 2b Summary of item analysis of Brain Drain Scale of push factors (N=254)

Extreme group comparison					Homogeneity test				
Top 27% group		Bottom 27% group			Item- total correlation				
	Mean	SD	Mean	SD	Mean	SD	T	P	R
Push factors	3.17	0.614							
Factor 1 Home effective institutions									
1. Domestic university excellent quality	3.28	0.875	3.99	0.573	2.53	0.848	12.186	0.000	0.479
2. Domestic optimistic economics	2.62	0.978	3.58	0.710	1.61	0.569	8.462	0.018	0.653
3. Domestic stable politics	2.71	0.990	3.62	0.799	1.76	0.699	14.960	0.000	0.678
4. Domestic reasonable labor rights	2.76	0.942	3.65	0.699	1.88	0.682	15.435	0.000	0.663
5. Domestic fair system	2.80	0.976	3.62	0.763	1.97	0.793	12.732	0.000	0.546
10. Domestic well innovation environment	3.25	0.970	3.93	0.662	2.45	1.036	10.322	0.000	0.511
Factor 2 Home well living conditions									
6. Domestic health insurance system	3.98	0.834	4.60	0.515	3.23	0.727	14.233	0.001	0.345
7 .Domestic stable goods price	3.19	1.017	4.11	0.637	2.35	0.797	15.529	0.000	0.506
8 .Stable social order	3.44	0.975	4.27	0.665	2.48	0.723	16.652	0.000	0.560
9 .Familiar environment	3.75	0.893	4.37	0.624	2.91	0.738	13.875	0.000	0.507

Table 3aExploratory Factors Analysis of the Parents' Pull Factors (N=254)

Factor 1: Home Sociocultural Advantages (Item 1.2.3.4)

Factor 2: Home Weak Economy Compare Host Advantages (Item 5.6.7.8.9.10)

Item Content	Mean	SD	Fac1	Fac2
Factor 1 Home Sociocultural impact			**loading**	**loading**
1.Parents or Relatives incentives	3.88	0.863	**0.796**	0.119
3.Network media impact	3.34	0.766	**0.774**	0.062
4.Yearning for foreign culture lifestyle	2.71	0.914	**0.771**	0.184

2.Teachers and Peers impact	3.74	0.729	**0.764**	0.128
Factors 2 Home weak Economy Compare Host Advantages				
7.Home long-term low wage	4.24	0.786	0.058	**0.828**
6. Home economic stagnation	4.11	0.750	0.029	**0.818**
8. Declining faith for Home development	4.09	0.810	0.034	**0.814**
10. Host high wage and better development	4.01	0.752	0.248	**0.692**
9. Host flexible learning system	4.20	0.752	0.314	**0.680**
5. Host various talent pool	4.31	0.712	0.323	**0.672**
Sum of squared loading (Eigenvalue)			1.827	4.239
Percentage of variance explained (%)			18.27	42.39
Cumulative percentage of variance (%)			18.27	60.66
Cronbach'α			0.777	0.863
KMO=O.834				

Table 3bSummary of item analysis of Brain Drain Scale of pull factors (N=254)

Extreme group comparison Homogeneity test

	Top 27% group		Bottom 27% group		Item-total correlation		
Mean SD	Mean	SD	Mean	SD	T	P	R
Pull factors 3.976 0.499							
1. Parents or Relatives incentive influence	3.88	0.860	4.45	0.517	2.97	0.753	15.958 0.068 0.467
2 . Teachers or peers encouragement	3.74	0.729	4.21	0.558	3.08	0.539	13.902 0.003 0.467
3. Influenced by media or networks	3.44	0.766	3.99	0.526	2.72	0.605	14.842 0.009 0.418
4 .Yearning for foreign lifestyle and culture	3.74	0.787	4.26	0.563	3.05	0.613	13.844 0.075 0.511
5 . Learn from the talents of various countries	4.31	0.712	4.92	0.277	3.59	0.692	13.686 0.000 0.630
6 .Limited domestic economic development	4.11	0.750	4.94	0.242	3.21	0.487	24.199 0.000 0.564
7 . Domestic wages maintain low rate	4.24	0.786	5.00	0.000	3.38	0.711	17.829 0.000 0.589
8. Declining faith for domestic employment	4.09	0.810	4.92	0.277	3.16	0.637	19.354 0.000 0.559
9 . Flexible learning in foreign countries	4.20	0.772	4.98	0.143	3.52	0.673	16.420 0.000 0.628
10. Enhance future employment security	4.01	0.752	4.90	0.306	3.30	0.558	19.137 0.000 0.592

Table 4Open-ended survey parents' perspectives of Brain Drain destinations and pursuit (N =232)

Item	N	%	Rank
Destination			
U.S.A	129	55.6%	1
China	25	10.8%	2
U.K	19	8.2%	3
Japan	15	6.5%	4
Singapore	14	6.4%	5
Others	30	13%	6
Pursuit			
More development	126	53.8%	1

Talent pool	34	14.5%	2
Creative	29	12.4%	3
Culture	27	11.5%	4
Environmental familiarity	11	4.7%	5
Others	5	2.2%	6

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