Advances in Computational Sciences and Technology
ISSN 0973-6107 Volume 10, Number 11 (2017) pp. 3233-3242

http://www.ripublication.com

Analyzing Student Migration Trends in Kerala: A Data-Driven Exploration Using Python

Dr.Jikcey Isaac*

Associate Professor Department of Mathematics & Statistics,
Assumption College Autonomous, Changanacherry,
Kerala-686101, India.

Abstract

Kerala is witnessing a steady trend of youngsters moving abroad for higher education. It is perhaps one of the states in the country experiencing a very high rate of international migration. The Intercontinental universities have emanated as an eminent feature in the international higher education outlook. Even though migration has intrinsically been connected to Kerala's development trajectory, the brain drain of a talented generation is more than likely to cause many social impacts. This paper provides an insight into the migration aspiration of the youth from Kerala and their awareness of migration. A questionnaire survey was conducted among the students and the data was analysed using Python to study the factors leading to such a situation

Keywords: International migration, Python code, Development trajectory, Chi-square test, Talented generation.

INTRODUCTION

In recent times, the trend of students migrating to foreign countries for higher education has become increasingly common in Indian society. [1]This phenomenon is reflected in the enrollment rates of Indian students in foreign universities, which have been consistently rising over the past few years. Shockingly, as of January 2021, the number of Indian studentsstudying abroad exceeded 1 million, highlighting the growing desire for global exposure and quality education. Kerala, in particular, has witnessed a steady increase in the number of youngsters moving overseas for higher education, with even tiny countries like Curacao having Malayali students.[2][4] According to the Ministry of External Affairs, in 2019 alone, 30,948 Malayali students went abroad. Despite the pandemic-induced decline in migration rates, experts predict a surge in the numbers in

the coming years. This trend underscores the importance of understanding the motivations and challenges of student migration for policymakers and education stakeholders.

The number of Indian students studying abroad has been on the rise, with over 1 million Indian students enrolled in 85 countries outside India as of January 2021. The number of students from Kerala going abroad for higher education has more than doubled in the last five years, with most exploring opportunities in Canada, the UK, and Australia.[3]

SIGNIFICANCE OF STUDY

The emerging trend of student migration from India is likely to impact the country in variousways. The purpose of the study is to observe the factors that are influencing a very steep increase in student migration from India by analyzing various factors. [5]The trend of student migration from India has been on the rise in recent years, which could be attributed to several factors such as a desire for better education, increased global exposure, and the prospect of better job opportunities after graduation.

Identifying the factors that influence students to study abroad and the challenges [6]they face in doing so, could help educators and administrators develop more attractive and accessible educational opportunities for students within India. Moreover, by providing insights into the patterns, motivations, and impact of studentmigration from India, this study could help policymakers develop more effective strategies to develop international interest in our universities and devise policies and measures to addressthis trend for the betterment of the country's education system and economy.[7]

The migration of Indian students to foreign countries has become a significant concern for India's economy, resulting in a loss of both capital and skilled individuals. [9]The majorityof Indian students, up to 90%, tend to migrate to the United States, Australia, the United Kingdom, Canada, and New Zealand. This massive outflow can be attributed to various factors, such as international developments like globalization, technological advancements, demographic trends, and aggressive policies aimed at attracting foreign students for financial gains. Recent surveys revealed that factors such as poor wages, low education standards, adverse economic situations, and better social status and security abroad, as well as political instability, gender bias, moral policing, and language barriers also motivate students to migrate. [10]Moreover, Indian students often seek better quality education, employment opportunities, cultural exposure, language proficiency, and a stable environment that can enhance their career prospects and personal growth.[8]

OBJECTIVES

1. Understanding the patterns of student migration.
2. Identifying the reasons for migration.

3. Assessing the impact of migration.
4. Evaluating the effectiveness of policies.
5. Identifying opportunities for improvement

Materials And Methods

Google Forms

The study aimed to understand the attitude and perception of the general public towards the phenomenon of student migration from Kerala. To achieve this, a survey was conducted among the target population of students aged 15 and above. The survey was distributed through a Google form, which allowed for easy dissemination and collection of responses. The questionnaire consisted of 20 questions that covered a range of topics including age, gender, educational institution, type of school or college, and place of residence, and were carefully crafted to elicit responses that would provide insight into the factors that influence student migration and the impact it has on the students themselves.

Python

The chi-square test was conducted using the responses obtained from the survey, and the statistical analysis was performed in Python. The SciPy library was utilized to implement the chi2 contingency() function, which provided three outputs: the statistic value, the p- value, and the degree of freedom. These outputs helped us in deciding upon the hypothesis and assessing the significance of the results. The chi-square test allowed us to assess the association between the variables of interest and make informed conclusions based on the results.

Data Analysis Using Python

To perform the Chi-square test, we utilized the Python programming language, specifically the scipy.stats library, which offers the chi2 contingency() function that enables us to execute the Chi-square test. The test provides us with three output values: the statistic value (which is useful for comparing to critical values to decide on a hypothesis), the p-value, and the degree of freedom (i.e., the number of variables that can vary freely).

We use the p-value to interpret the Chi-square test's results. If the p-value is lower than the assumed significance level of 0.05, we fail to accept the null hypothesis that there is no association between the variables. In other words, we reject the null hypothesis and accept the alternative hypothesis's claim, which implies a connection between the given data. If the p-value is greater than or equal to the significance level of 0.05, we accept the null hypothesis that there is no association between the variables. This implies that there is not enough evidence to claim a relationship between the given data.

Chi-square test between Gender and Interest in moving abroad

```
# import

os import

pandas

from scipy.stats import chi2_contingency
migration = pandas.read_csv(r"C:\Users\linda\Downloads\Migration.
csv")
categorical_col = ['Name', 'Age', 'Income','Abroad', 'Res', '
   Gender', 'Edu Exp','Increase in job opportunities in India?',
   '15. Purpose of Migration', '16. The Country you prefer to
   migrate to']

contingency_gender_abroad = pandas.crosstab(migration.Gender,
   migration.Abroad)
print("contingency_gender_abroad: ",contingency_gender_abroad)
 c, p, dof, expected = chi2_contingency(contingency_gender_abroad)
                              print("c: ",c)
print("p: ",p)
print("dof: ",dof)
```

Output

```
contingency_gender_abroad:  Abroad   No  Yes
Gender
Female  107  222
Male     27   56
Others    0    1
c:  0.48145410497026575
p:  0.7860561491827474
dof:  2
```

From above, 0.7860561491827474 is the p-value, 0.4814541097026575 is the statistical value and 2 is the degree of freedom. As the p-value is greater than 0.05, we accept the NULL hypothesis and assume that gender and interest to move abroad are independent of each other.

Chi-square test between Country students prefer andPurpose of Migration

```
# import os
import
pandas
from scipy.stats import chi2_contingency
migration = pandas.read_csv(r"C:\Users\linda\Downloads\Migration.csv")
categorical_col = ['Name', 'Age', 'Income','Abroad', 'Res', 'Gender',
   'Edu Exp', 'Increase in job opportunities in India?', '15. Purpose
    of Migration', '16. The Country you prefer to migrate to']
contingency_country_purpose = pandas.crosstab(migration['16. The
   Country you prefer to migrate to'], migration['15. Purpose of
   Migration'])
print("contingency_country_purpose: ",contingency_country_purpose)
c, p, dof, expected = chi2_contingency(contingency_country_purpose)
print("c: ",c)
print("p: ",p)
```

1

Output

```
16. The Country you prefer to migrate to                         ...
.                                                  0          1  ...    0   0
Australia / New Zealand                           10         25  ...    0   2
Canada                                            16         42  ...    0   9
Germany                                           13         23  ...    2   2
Korea                                              1          0  ...    0   0
Middle Eastern Countries (UAE, Qatar, Turkey etc.)  8          6  ...    0   0
Other                                              7         15  ...    0   6
Switzerland                                        1          0  ...    0   0
UK                                                21         32  ...    1   0
US                                                 7         13  ...    3   1

[10 rows x 5 columns]
c:  58.3874704254652
p:  0.010541589383085154
dof:  36
```

From above, 0.010541589383085154 is the p-value, 58.3874704254652 is the c-value and 36 is the degree of freedom. As the p-value is lesser than 0.05, we accept the alternate hypothesis and so, there exists a relation between the country students choose to migrate to and their purpose of migration Chi-square test between Educational experience and Interest to move abroad.

```
# import
os import
pandas
from scipy.stats import chi2_contingency
migration = pandas.read_csv(r"C:\Users\linda\Downloads\Migration.
csv")
categorical_col = ['Name', 'Age', 'Income','Abroad', 'Res', '
   Gender','Edu Exp', 'Increase in job opportunities in India?',
   '15. Purpose
    of Migration', '16. The Country you prefer to migrate to']
contingency_education_exp_abroad = pandas.crosstab(migration['Edu
Exp'
   ], migration.Abroad)
print("contingency_education_exp_abroad:
",
   contingency_education_exp_abroad)
c, p, dof, expected = chi2_contingency(
   contingency_education_exp_abroad)

print("c: ",c)
print("p: ",p)
print("dof: ",dof)
```

Output

```
contingency_11_14:  14. Are you interested in moving abroad for higher studies?  No  Yes
11. Was your educational experiences in line wi...
Maybe                                                                            41   71
No                                                                               21  187
Yes                                                                              72   21
c:  134.10675688169786
p:  7.569858302455896e-30
dof:  2
```

From above, 7.5698583024855e-30 is the p-value, 134.10675688169 is the statistical value and 2 is the degree of freedom. As the p-value is lower than 0.05, we reject the NULLhypothesis and assume that interest in moving abroad and past educational experiences are dependent of each other.

Chi square test between Job opportunities and Interest in moving abroad

```
# import os

import pandas

from scipy.stats import chi2_contingency
migration = pandas.read_csv(r"C:\Users\linda\Downloads\Migration.csv")
categorical_col = ['Name', 'Age', 'Income','Abroad', 'Res', 'Gender','Edu Exp

    ', 'Increase in job opportunities in India?', '15. Purpose

     of Migration', '16. The Country you prefer to migrate to']
contingency_job_abroad = pandas.crosstab(migration['Increase in job

    opportunities in India?'], migration.Abroad)

print("contingency_job_abroad: ",contingency_job_abroad)
c, p, dof, expected = chi2_contingency(contingency_job_abroad) print("c: ",c)

print("p: ",p)
print("dof: ",dof)
```

Output

```
contingency_job_abroad:  Abroad
Increase in job opportunities in India?
No                                    83  170
Yes                                   51  109
c:  0.007933216616194 39
p:  0.9290273868024032
dof:  1
```

From above, 0.9290273868024032 is the p-value, 0.007933216616194 39 is the statistical value and 1 is the degree of freedom. As the p-value is greater than 0.05, we accept the NULL hypothesis and assume that interest in moving abroad and an increase in job opportunities are independent of each other.

Chi-square test between Family Income and Interest in moving abroad

```
# import os

import pandas

from scipy.stats import chi2_contingency
migration = pandas.read_csv(r"C:\Users\linda\Downloads\Migration.csv")
categorical_col = ['Name', 'Age', 'Income','Abroad', 'Res', 'Gender','Edu Exp

    ', 'Increase in job opportunities in India?', '15. Purpose

     of Migration', '16. The Country you prefer to migrate to']

contingency_income_abroad = pandas.crosstab(migration.Income,

    migration.Abroad)
print("contingency_gender_abroad: ",contingency_income_abroad)
c, p, dof, expected = chi2_contingency(contingency_income_abroad) print("c:

",c)

print("p: ",p)
print("dof: ",dof)
```

Output

```
contingency_gender_abroad:  Abroad           No  Yes
Income
1 lakh - 3 lakh   40  100
3 lakh - 6 lakh   24   33
6 lakh - 10 lakh   9   17
Above 10 lakh      9   15
below 1 lakh      52  114
c:  3.8158722962336666
p:  0.4314979384934785
dof:  4
```

From above, 0.4314979384934785 is the p-value, 3.8158722962336666 is the statistical value and 4 is the degree of freedom. As the p-value is greater than 0.05, we accept the NULL hypothesis and assume that interest in moving abroad and family income are independent ofeach other.

Major Findings

After a thorough analysis of data gathered from 413 respondents, valuable insights have emerged, shedding light on key research questions and objectives. The majority of participants were female (79.7%), primarily in the 19 to 22 age bracket (79.7%), and predominantly single undergraduate students. Notably, 22% of the sample qualified for reservation based on social or economic criteria.

Survey results unveiled that 40.2% reported an annual income below 1 lakh, while merely 5.8% indicated a family income exceeding 10 lakhs per annum. A significant revelation was the strong interest in pursuing higher education abroad, with 67.6% expressing such aspirations, and 56.3% specifying a preference for master's programs.

Challenging the educational landscape in India, 44.3% noted that their academic experiences did not align with expectations, and 42.1% were uncertain. This signals potential room for improvement in the educational system to better cater to student expectations. Additionally, 61.3% perceived no increase in job opportunities in India, highlighting the need for interventions to enhance the country's job market.

Assessment of various aspects of the Indian education experience, including teaching quality, course availability, safety, and extracurriculars, yielded a moderate satisfaction level (average score of 3 out of 5). Family support for migration (77.4%) was common, and 79.6% reported having friends or relatives already studying abroad, suggesting the influence of social networks on educational decisions.

Regarding funding, 46.6% planned on using bank loans, 29.7% personal funds, and 15.8% relied on scholarships for overseas education. The decision to pursue education abroad was influenced by a myriad of factors such as financial upliftment, course availability, personal independence, safety concerns, improved educational opportunities, better living standards, enhanced career prospects, and social security. Notably, weather did not emerge as a significant factor in the decision-making process.

Based on the survey findings, the following suggestions can be considered for improving thehigher education system in India:

1. Strengthen the quality of education:
2. Improve the job market:.
3. Encourage research and innovation:
4. Provide more financial assistance:
5. Address safety concerns:

CONCLUSION

This study illuminates the complex array of factors influencing students' choices between pursuing higher education in India or abroad. Addressing challenges and leveraging opportunities presented by this trend is crucial for policymakers to ensure equitable access to quality education, securing a promising future for all students. Despite areas requiring improvement, such as job prospects and educational quality, promising government initiatives, if effectively implemented, could address concerns identified in the survey. A collective effort from stakeholders is essential to cultivate an educational landscape fostering student aspirations and facilitating their maximum potential.

The future of student migration from Kerala hinges on diverse factors, demanding collaborative efforts from policymakers and stakeholders. Establishing an environment that encourages young individuals to pursue education and career goals within the state and country is pivotal for shaping the educational trajectory and professional pursuits of the region's students.

REFERENCE

[1] Dutta B. (2013, May 27). Why higher education is sinking. *The Indian Express*. Retrieved from http://indianexpress.com/article/opinion/columns/why-higher-education-is-sinking/

[2] ICEF. (2012, November 27). *Number of Indian students heading abroad increases dramatically over past decade*. Retrieved from http://monitor.icef.com

[3] Zachariah, K. and S.I. Rajan, 2015. "Dynamics of emigration and remittances in Kerala: Results from the Kerala migration survey 2014", CDS Working paper 463, September http://cds.edu/wpcontent/uploads/2015/10/WP463.pdf

[4] Adrien Presley, Datha Damron-Martinez and Lin Zhang, A Study of Business Student Choice to Study Abroad: A Test of the Theory of Planned Behavior, Journal of Teaching in International Business, 21:4, 227- 247, DOI: 10.1080/08975930.2010.526009, 2010.

[5] Altberts, Heike C., and Helen D. Hazen. “There Are Always Two Voices: International Students’ Intentions to Stay in the United States or Return to Their Home Countries.” International Migration 43.3:131–154, 2005. Agarwal, P., Indian higher education: Envisioning the future. Sage Publications India, 2009.

[6] Metka Hercog and Mindel van de Laar, Motivations and Constraints of Moving Abroad for Indian Students, Int. Migration and Integration 18, 749–770. https://doi.org/10.1007/s12134-016-0499-4, 2016.

[7] *World Education News and Reviews (WENR)*. (2015). *International student mobility trends 2015: An economic perspective.* Retrieved from http://wenr.wes.org/2015/02/international-student-mobility-trends-2015-an-economic-perspective

[8] Indicators, Organization for Economic Co-- operation and Development. Education at a Glance; https://www.oecd.org/education/Education-at-a-Glance-2014.pdf, 2014

[9] Bhagat R.B., K. Keshri & I. Ali. 2013. “Emigration and flow of remittances in India” in Migration and Development, Vol. 2, No.1, May. pp. 93-105.

[10] Farrugia C. A. (2014). *Charting new pathways to higher education: International secondary students in the United States*. Institute of International Education. Retrieved from www.iie.org/~/media/Files/.../IIE-International-Secondary-Students-In-The-US.pdf?la