The Global Offshore Financial Structure: An Analysis of Companies, Trusts, and Funds and its Beneficiaries in High Income Non OECD Nations

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***Abstract*— In June 2013, the International Consortium of Investigative Journalists (ICIJ) released a database that exposed secret offshore financial activity information of entities across 174 countries. Among the income groups defined by the Word Bank, high income and non OECD countries appeared as the leaders both in providing and using offshore banking services in comparison to the other income groups by a large margin. This work identifies political patterns between those high income and non OECD countries using economic and political data from World Bank and Transparency International in conjunction with the ICIJ database. Lastly, through an unsupervised clustering algorithm it was found that countries with high offshore activity tends to have high GDP per capita, low deposit interest rates, and are perceived to be highly corrupt.**

***Index Terms*—offshore banking, finance, pattern analysis.**

I. Introduction

Financial offshore activity is usually sought for the purposes of financial privacy, protection of financial assets, and easily accessible deposits. Although engaging in offshore activities is legal in most part of the world, this structure of privacy an anonymity also offers a financial platform for illegal activities such as drug trafficking, money laundering, tax dodging, etc. The International Consortium of Investigative Journalists (ICIJ) have been investigating this world of secrecy for almost 30 years, silently gathering data about several thousands of offshore entities and their owners. This information was made public in 2010.

II. Business understanding

The offshore industry has firms specialized in helping to set up hard-to-trace "shell companies" for clients around the world. It is not in the interest of these firms to know where the money comes from nor what the purpose of an offshore entity is. By adopting this posture, they see themselves as legal and honest companies that are solely dedicated to provide secrecy and protection services.

Tracking the ownership of an offshore entity is very intricate and challenging because most of them are connected to a chain of other offshore entities that often loops around before connecting to the final owner. For example, a company in Singapore would be controlled by a company in Hong Kong, which would be controlled by a company in Cyprus, which would be controlled by a company in Russia, and so on. This structure makes it hard to trace the owner of an entity by making it virtually impossible to follow the paper trail around the world.

III. ICIJ Database understanding

The database released by ICIJ results from two larger databases that according to ICIJ had been fed for nearly 30 years by two companies: Singapore-based Portcullis Trust Net (PTN), and Commonwealth Trust Limited (CTL), based in the British Virgin Islands. "Both firms specialize in setting up offshore financial structures. They have helped tens of thousands of people create offshore companies and trusts, as well as hard-to-trace bank accounts" (ICIJ website).

The information contained in this database shows the relationship of several thousands of people and entities around the globe. Information available are limited to names of people and entities, description of them including location, and description of the nature of each relationship (director, shareholder, related company, etc.).

All this information comes in the format of 3 csv files. One contains information about all nodes, a second file contains all the relations between the nodes, and a third file contains country information of all nodes that ICIJ was able to find.

IV. Data pre-processing

There is a specific terminology in the offshore world that is important to know in order to comprehend the ICIJ data. Among those several terms, three are used throughout this work:

Entity: A company, trust, or fund created in a low-tax, offshore jurisdiction.

Officer: a person or company who plays a role in an offshore entity.

Master Client: often an intermediary or go-between who helps a client set up an offshore entity.

Onlty these three category of nodes are relevant for the scope of this work. Therefore, all other types of entries from the nodes csv file were removed on the data preprocessing. Furthermore, because the goal of this work depends on the country information, all nodes not containing such information was also removed on the data preprocessing stage. The result of all this procedures on the nodes file is shown on the table below.

Table 1

TABLE I
PRE-PROCESSED NODES

Node Types	Count
Officer	66,599
Entity	94,336
Master Client	7,994
Officer and Master Client	1,137

The file containing the edges was not used in this work. That is because the nature of the relationships in this type of offshore industry, where connections between nodes are intricate and often meaningless, makes it hard to draw a conclusion about it. Furthermore, because the goal of this work is to identify location patterns of peoples and entities that are related to offshore activities, not their relation specifically, the file containing the edges was not necessary to be evaluated.

Nevertheless, a summary of relations found in edge csv file is shown on Table II.

Table 2

TABLE II
RELATIONS SUMMARY

Node 1	Node 2	Count
Officer	Entity	245,375
Master Client	Entity	97,037
Officer and Master Client	Entity	51,754
Officer	Officer	1,187
Entity	Entity	622
Officer	Officer and Master Client	46
Officer and Master Client	Officer	5

The final count of Officers in the database after the cleaning process was 66,599. However, in order to select out only people from the Officers category a second filtering was needed. In order to achieve that, a selection of nodes not containing specific key words was performed. The keywords are expressions highly related with companies like “Limited”, “Corporation”, “S.A.”, “LLC”, “Investment”, “International”, “Trust”, “Fund”, and etc. A total of 32 filters was applied, which then produced a list of 55,490 elements of supposedly all people.

Table 3

TABLE III
FILTERED OFFICERS

Node Types	Count
Total Officers	66,599
People Officers	55,490

V. WORLD BANK DATA

The World Bank is a financial institution of United Nations that besides providing loans to developing countries, it also does research in the area of politics and economics. Most of the results are made publicly available on the internet.

Political, economic, and social development data from World Bank was used to identify potential correlation with the number of offshore officers and entities in each country. The data set chosen from World Bank for this study regarded the following items:

- Transparency Index
- GINI Index
- GDP per capita
- Central government debt (% of GDP)
- Imports of goods and services (% of GDP)
- Gross savings (% of GDP)
- Deposit interest rate
- Real interest rate
- Tax revenue (% of GDP)

The Transparency Index refers to the year of 2010. All the other data was obtained by taking the average for each country that had at least 1 entry between 2001 and 2010. This approach was adopted to include important countries such as Russia, Argentina, and Cyprus, which otherwise would not be included due to absence of information in some of these years.

There is a countries categorization by income used by World Bank, which tries to group nations with similar patterns of development. This methodology was adopted in this work for purposes of pattern identification. The name of the income groups and the number of countries of each group is shown on the table below.

Table 4

TABLE IV
COUNTRIES BY INCOME GROUP

Income Regions	Countries
High income: non OECD	44
Upper middle income	55
Lower middle income	50
High income: OECD	31
Low income	34

VI. Offshore Activity

A quick look at the cleaned data reveals that High Income and non OECD countries are highly involved in offshore activity, both as a provider and consumer.

TABLE V
OFFSHORE ACTIVITY BY INCOME GROUP

Income Regions	People Involved
High income: non OECD	20,183
Upper middle income	11,519
High income: OECD	7,148
Lower middle income	3,939
Low income	122

Figure 1

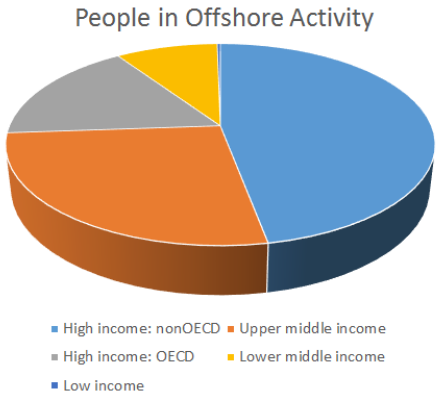
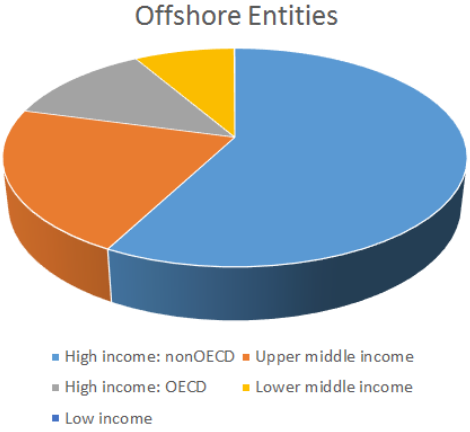


TABLE VI
OFFSHORE ENTITIES BY INCOME GROUP

Income Regions	People Involved
High income: non OECD	45,652
Upper middle income	17,027
High income: OECD	9,811
Lower middle income	6,594
Low income	50

Figure 2



VII. Transparency data

The Transparency Index is a coefficient calculated by Transparency international and measures how corrupt a country public sector is perceived to be. The index varies from 0 (highly corrupt) to 10 (very clean).

The transparency index used in this work is from 2010, which has a total of 170 countries. From those, 17 are HINO countries. The graphs below show the number of entities and people involved in offshore activity against the index of transparency of each country.

Figure 3

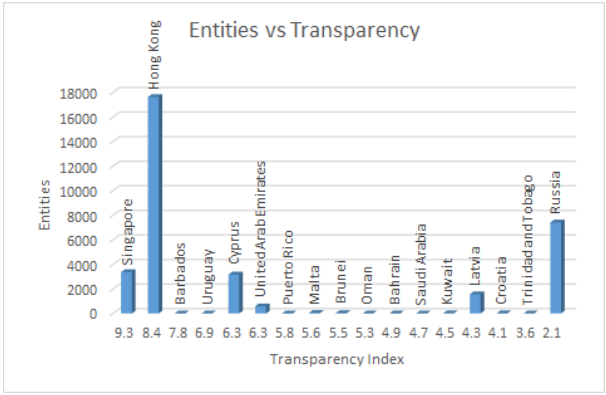
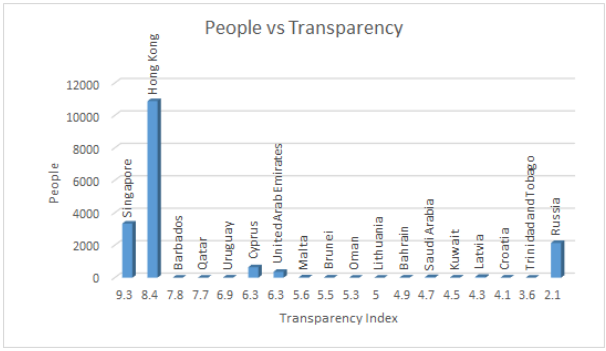


Figure 4



The least corrupt country (Singapore, rank 1) and one of the most corrupt country (Russia, rank 154) are significant in both hosting offshore entities and seeking offshore services in HINO countries. This leads to the question whether extremes of corruption level are related to offshore activity. In order to find the answer, the scope of analysis was amplified to a global level to see if the patter repeats on a larger scale. The following graphs shows the same information of the previous graphs, but this time on a global scale.

Figure 5

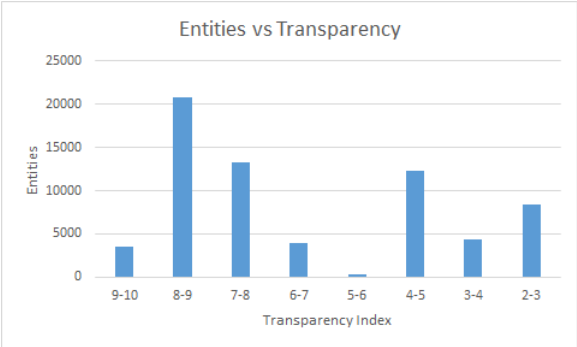
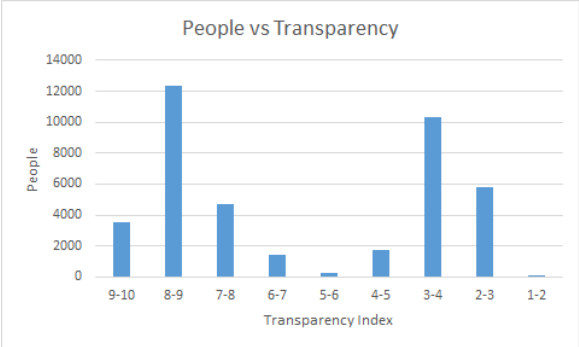


Figure 6



Looking at the graphs it seems to be clear that there are a higher number of countries involved in offshore activity around two points of the Transparency Index range. One is the region where transparency is high and the other is where transparency is low.

It is not possible, however, to come to a definite conclusion on this issue. The global scenario does not seem to be as clear as the HINO countries scenario, although a pattern is observable. It might indicate that extremes levels of corruptions are related with offshore activity, but the results were not conclusive.

VIII. Clustering

The relevance of HINO countries in the global financial offshore activity is clear looking at the aggregated data. The main goal of the clustering procedure was to see if an unsupervised method would be able to identify this distinct group of HINO countries. A secondary goal was to see if the clustering identifies other meaningful clusters of countries.

A total of 11 variables was used to perform the clustering. These variables are shown on the following table.

Table 5 – Clustering Variables

Variables	Source
People Involved In Offshore Activities	ICIJ
Number of Offshore Entities	ICIJ
Transparency Index	Transparency International
GINI Index	World Bank
Gross Domestic Product per capita (in dollars of 2014)	World Bank
Government Debt (% of GDP)	World Bank
Imports of Service and Products (% of GDP)	World Bank
Gross Savings (% of GDP)	World Bank
Deposit Interest Rate (%)	World Bank
Real Interest Rate (%)	World Bank
Tax Revenues (% of GDP)	World Bank

It is important to note that only 38 countries had values for all the 11 variables. The clustering was performed by XMeans, which in turn identified a total of 2 clusters. The result is summarized in the table below.

Table 6 – Clustering Result, 11 variables

Attribute	Full Data (38)	Cluster 1 (13)	Cluster 2 (25)
Transparency	5.34	8.31	3.79
GINI	34.21	30.74	36.02
GDP	19,222.12	42,317.70	7,212.42
Debt	48.28	51.20	46.76
Imports	46.72	36.77	51.89
Savings	24.95	26.50	24.15
Desposit Int.	4.99	2.07	6.51
Real Int.	4.33	3.05	4.99
Tax Rev.	17.04	18.84	16.11
Peoples ICIJ	263.16	180.00	306.40
Entities ICIJ	416.68	256.46	500.00

This first clustering trial reveals that some of the variables seems not to be distinct between the clusters identified. Such variables are the ones that are not highlighted on the table. A second attempt of clustering was performed by dropping those variables that seems not to affect clustering, increasing the list of countries from 38 to 80. Result of this second trial is summarized on the table below.

Table 7 – Clustering Result, 6 variables

Attribute	Full Data (80)	Cluster 1 (23)	Cluster 2 (57)
Transparency	4.97	7.92	3.77
GDP	15,134.50	34,779.34	7,207.63
Imports	49.05	53.13	47.40
Desposit Int.	6.53	2.64	8.09
Peoples ICIJ	439.41	780.78	301.67
Entities ICIJ	671.68	1,229.39	446.63

The cluster 1 is a group of countries with low level of corruption, high GDP and small deposit interest rate. Also, these are the group of countries that are considerably more involved in financial offshore activities than the cluster 2, which are the group of countries with high level of corruption, low GDP, and high deposit interest rate.

According to this clustering, most of the HINO countries seems to be inside the cluster 1.

Table 8 – HINO countries and Cluster 1

Attribute	Cluster 1 (23)	HINO (15)	Std. Dev.
Transparency	7.92	5.66	1.91
GDP	34,779.34	19,278.79	10,433.38
Imports	53.13	62.88	50.12
Desposit Int.	2.64	3.77	3.12
Peoples ICIJ	780.78	1,168.33	2,857.68
Entities ICIJ	1,229.39	2,256.60	4,729.57

IX. Conclusion

Corruption level of a country and its involvement in financial offshore activities seems to be correlated. Particularly among HINO countries, the two extremes of corruption level (high corruption, very low corruption) presented significantly higher participation in such activities, while on the global scenario, the same pattern was also present, although with less clarity.

The clustering by XMeans of countries listed on the ICIJ database detected two clusters using 6 variable provided by the World Bank and Transparency International. Because cluster 1 was the group of countries that were highly active on the global financial offshore activity, some conclusions could be made regarding the characteristics of those countries. The conclusion was that countries that attract and practice higher level of offshore activities are perceived as highly corrupt, have high GDP per capita, and has low deposit interest rates.