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The Role of Dual Nationality, Financial System Sophistication and Cryptocurrency in Money Laundering

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Abstract

Water always finds its way" so do the money launderers, who are always successful in finding new ways of committing the crime. This study primarily aims to identify opportunities that launderers are exploiting to whitewash their black money. Dual nationality (DN), financial system sophistication (FSS), and cryptocurrency legal status (CCLS) are the advanced opportunities being used by launders to clean their funds. Some studies highlight the link between cryptocurrency and money laundering, but the role of dual nationality and financial system sophistication in money laundering is still a less addressed phenomenon (Ebeke, 2011) and (T. P. and J. Walker, 2011). The objective of this study is to explore the role of these three variables in money laundering by making improvements to the original version of the Walker model. The study's theoretical model was developed by borrowing justifications from Rational Choice Theory (RCT). For quantitative analysis, FGLS was employed over strongly balanced panel datasets. The final dataset of the study was prepared by gathering secondary data from 177 countries for 11 years (2009-2019). The study has found that overall, financial system sophistication is an important factor in choosing a laundering centre around the globe. However, Pakistani launderers do not perceive FSS as an attractive element for laundering their black money. In contrast, dual nationality was identified as a significant element in money laundering from Pakistan to other countries. However, the aspect of cryptocurrency legal status was found to be a significant attractive element for both national and international launders. The findings of the study guide policymakers and practitioners in strengthening the anti-money laundering strategy.

Introduction

Due to its impact and scale, the dilemma of money laundering (ML) has become an area of serious concern for policymakers, practitioners, and academic researchers. (UNODC, 2003) stated that crimes generate illegal funds, amounting to 3.6% of world GDP, and out of

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this, 2.7% is laundered. This massive amount of money laundering is almost equal to the GDP of the world's third-largest economy UK (Moody, 2013). And further, due to globalization and technological advancements, the consequences of money laundering in societies, economies, and financial systems are intensified (M. & Truman, 2014). Developing economies with weak institutions are particularly more vulnerable to the consequences of money laundering (Levi & Gilmore, 2002).

This issue of money laundering has become our grave national concern due to some events that occurred in the last few years. One of the events is the "Panama and Pandora leaks of 2016 and 2019, respectively" (DAWN, 2016). These leaks confirm the outflow or leakage of already limited resources in Pakistan towards other countries. The second event occurred in 2018 when Pakistan was again placed on the FATF grey list (Tribune, 2018) which put a big question mark on the transparency and stability of Pakistan's financial infrastructure and ultimately affected upcoming foreign investments in Pakistan (Khan et al., 2018). Further, the Basel index ranked Pakistan at 23 of 125 countries, indicating Pakistan's increasing vulnerability to money laundering (Basel, 2019).

The problem is that even after global anti-money laundering efforts at such a large scale, no observable decline in money laundering activities has been seen (Brigitte Unger & den Hertog, 2012). Because as anti-money laundering (AML) regulations against the identified techniques of money laundering become stern over time, launderers seem to switch from the more controlled parts of financial markets to the less controlled or unidentified parts of the financial and other markets to fulfil their objectives. Launderers are exploiting the opportunities created by globalization and technological advancement more actively than others. An effective anti-money laundering (AML) framework should be continuously updated as the criminals are updating. Identifying new factors contributing to money laundering is critical for an effective and updated AML framework. Dual nationality (DN), financial system sophistication (FSS), and cryptocurrency legal status (CCLS) are the advanced opportunities being used by launders to clean their funds. This study has explored the role of these three variables in money laundering by tracing the places used for cleaning or laundering illegal funds. For this purpose Walker model has been used by making improvements in its original version. The Walker model is updated because it has not been improved since 2006, and multiple aspects have been changed regarding money laundering after 2006.

Literature Review

Money laundering has several definitions, using different terms, which results in varying concepts. There exists no single or universal description of money laundering. Among those definitions, the definition which was used in this study for hypothesis development and analysis purpose is by the Financial Action Task Force (FATF), which is "The processing of criminal proceeds to disguise their illegal origin to legitimize the ill-gotten gains of crime" (FATF, 2003). Launderers search for a place where they can hide their illicit funds or can camouflage these funds as legal earnings after having illegal money (Brigitte & Hertog, 2012). This study is an attempt to identify those unidentified characteristics of laundering places that make them more favourable for laundering activities. In literature, only one model is available that focuses on this aspect of money laundering; this model is known as the "Walker model".

Specifically, the Walker model has been used because it is the only model which helps to trace or identify the places on the globe preferred by launderers for cleaning their illegal funds. This model also highlights the factors affecting the preference of the launderers while choosing a laundering centre.

The Walker Model

It is the most extensively used and comprehensive model regarding money laundering. Only this model answers the questions related to money laundering on the border level. It measures the amount of money laundering and traces the flow of illegal funds across countries or describes the preferences of launderers to clean the black money. In 1999 Walker developed his model to trace the laundering places on the globe by considering some assumptions (Walker, 1999). Walker assumed that criminals make money from crime in every country, but the amount they make from each crime varies from country to country. Because of the high proceeds per crime, criminals make more money in rich countries than in developing countries. Since criminals also have basic needs to meet, they do not launder all of their money. Further, the laundering process is not always required to cross borders; sometimes, criminals clean their funds in their home country, where the local financial sector provides opportunities and enough cover. Moreover, launderers found those countries most suitable for laundering with appropriate banking regimes, stable economies, and tax havens. "Hot money" or the criminal proceeds will be attracted to those countries with which launderers or home countries have trading, ethnic, language, or geographical links.

Walker proposed his model in 1999 by incorporating logic from Tinbergen's gravity model of international trade (Walker 1999). Walker constructed his model by considering various factors affecting launderers' decision-making while choosing laundering places. The issue of money laundering can never be dealt with properly without considering the role of these foreign destinations, which are the biggest facilitators of money laundering activities (Soni, 2008) and (Schwarz, 2011). Walker stated that launderers prefer those places or countries on the globe which provide launderer-friendly environments. He identified some factors which help to generate a launder-friendly environment in a country and ranked these countries by creating an "attractiveness index". These factors include high economic strength (GDP), high levels of banking secrecy (BS), a lax attitude of the government towards anti-money laundering regulations (GA), availability of fast modes of transition (SWIFT), and less physical distance (PD). All these factors provide launderers confidence in the safe and secure laundering of illegal funds. Walker has also highlighted two factors that reduce the attraction of any country to laundering activities because these factors increase the risk of losing funds. The elements include high conflict situations in a country (CF) and high levels of corruption (CR). There is room for further improvements in the walker model to generate more effective and contemporary results (Unger, Siegel, and Ferwerda 2006). In 2006 B. Unger and his colleagues updated the model by adding five more variables. These include Deposits in-country Financial systems (FD), Similar Language (LA), Similar Colonial Background (CB), and Trading partners (TP). All the factors make a country more attractive for laundering, whereas the fifth variable, Egmont Group Member (EG), reduces the Attractiveness of countries for laundering activities. (Roman et al., 2021) and (Roman & Schaefer, 2022) used the Walker

model to check the projecting competency of its independent variables. The objective of this study is to explore the role of Dual nationality (DN), financial system sophistication (FSS), and cryptocurrency (CCLS) in money laundering by improving or further updating the Walker model. The detail of three variables introduced by this study in the walker model, along with their hypothesis, is presented below:

Financial System Sophistication (FSS)

The first variable this study aims to introduce in the walker model is "Financial System Sophistication." Generally, FSS means the diversity of financial institutions and financial instruments in a country's financial system (Feldmann, 2013). This study used the definition and data of financial system sophistication provided by the world economic forum (WEF). Financial System Sophistication means "The variety of financial institutions and instruments available in an economy and also the level of political influence over financial markets" (World Economic Forum (WEF), 2008). The sophistication of the financial system assures launderers as they do not fear losing their funds because the financial system is stable enough (Ferwerda, 2012). The highly sophisticated system provides confidence to the launderers, offers high returns, and facilitates the creation of a complex layering strategy. Further (ECOLEF, 2013) has also stressed the importance of FSS regarding money laundering. FATF states that in the layering phase, the launderer/offenders try to choose an offshore financial hub, a world banking centre, a large national/regional/international business centre, or any location that provides sophisticated or developed commercial or financial infrastructure (FATF, 2020). Lastly, rational choice theory supports the argument that as rational individuals, launderers choose those places to launders, which provide both more opportunities to hide funds and identity and offer higher returns.

H1a: *Highly sophisticated financial system makes a country more attractive for laundering activities from Pakistan.*

H1b: *Highly sophisticated financial system generally makes a country more attractive for laundering activities.*

Crypto Currency Legality Status (CCLS)

Despite very serious, advanced, and practical efforts against money laundering, no substantial decline has been observed in money laundering activities (Brigitte Unger & den Hertog, 2012). It's not just technology advancing daily but also the money launderers and their techniques. Cryptocurrency is a new avenue that launderers are very actively exploring. The second variable this study incorporated into the Walker attractiveness index is cryptocurrency legality status. "Virtual currency, or virtual money, is a digital currency which is largely unregulated and usually controlled and issued by developers; it is used and accepted electronically among the members of a specific virtual community." The argument was that cryptocurrency provides a high level of anonymity, which is the fundamental concern of the launders. So being rational individuals (rational choice theory), criminals opt for such places where they can trade in cryptocurrency. Further, countries that legalize cryptocurrency trade are the favourite places for launderers. Various academic studies have pointed out the relationship between cryptocurrency and money laundering. (Irwin & Dawson, 2019) stated

cryptocurrency as a vehicle for money laundering and many other illegal activities. Cryptocurrency is a new avenue that empowers criminals with the most advanced tools to pore billions of dollars generated from criminal activities into a legitimate system. Digital currencies put another layer of complexity on AML efforts because, contrary to real currency transactions, there are no physical places or materials to observe and collect proof of illicit activities (Bryans, 2014).

H2a: *Legality of cryptocurrency in an economy enhances its Attractiveness for laundering activities from Pakistan.*

H2b: *The legality of cryptocurrency in an economy generally enhances its Attractiveness for laundering activities.*

Dual Nationality (DN)

This study introduced the third and last variable in the Walker model: "dual nationality." This variable is presented in the second step of the Walker model, which is "distance deterrence." Dual citizenship or dual nationality means that, at the same time, an individual has citizenship in more than one country. Holding dual citizenship status gives multiple benefits to the holder, like commercial, travel, or personal gifts. Numerous arguments have been used to introduce this variable in distance deterrence indicators discussed below. Walker and B. Unger argued that all the factors facilitating or enhancing trade between countries also promote money laundering (gravity theory). Dual nationality also provides commercial or trade benefits to its holder (Oloufade & Pongou, 2013) stated that dual nationality is a significant factor in enhancing international trade, international labour mobility, and foreign direct investment. Further (Ebeke, 2011) studied the link between cross-border remittances and dual citizenship. He observed a significant positive relationship and stated that countries with dual nationality agreements have three times more remittances than those that do not have double nationality agreements. The current study argued that dual nationality plays a role in the cross-border movement of legal funds; it can also affect the flow of illegal funds. Moreover (Khan et al., 2018) also, based on (Ebeke, 2011) findings, suggested exploring the role of dual nationality in money laundering in the future direction. "Dual nationality holds potential for disguising true identity, and cases of dual nationality are frequently identified with money laundering" (FATF, Know your country, 2022). The rational choice theory also supports the argument that rational launderers choose those countries for laundering their funds where they have dual nationality, as they get many travel and commercial benefits. This variable is studied only concerning Pakistan as Chief Justice of Pakistan, "Mian Saqib Nisar", stated that corrupt public official uses dual nationality to pelt their illegal earnings from corruption. These officials are risky for the country's interest and have to choose between their job and foreign nationality (Dawn, 2018).

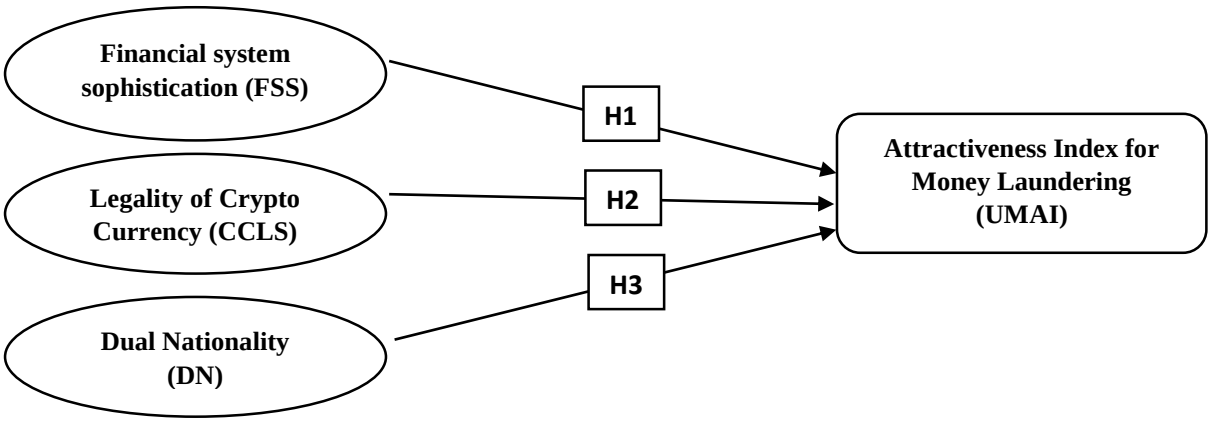
H3: *Dual nationality agreements make a country more attractive for money laundering from Pakistan.*

Theoretical Groundings of the Study

Before understanding the theoretical grounding of the models, it's important to understand that money laundering is not a common but an organized crime of transnational nature. Money laundering is frequently categorized as an "organized crime" because it fits many characteristics of organized crime, like huge financial gains through sophisticated schemes and services (Clinard et al., 1994). Further, it involves complex and formal organizations to camouflage the origin of illegal funds (Lyman & Potter, 2011). Money launderers' goal is to "clean" funds with complete "anonymity," "safety," and "high returns."

"Organized criminals" are often stated as rational actors (Lyman & Potter, 2011). Money launderers are rational criminals and choose places for laundering, which helps them to fulfil their goals. Findings (Maria, 2014) reveal that different actors in the money laundering process exhibit different levels of rationality. All the actors except masterminds involved in the money laundering process take decisions under bounded rationality, whereas masterminds are found to be "truly rational," which means they involve themselves in rigorous calculations and reasoning before selecting the optimal alternative. Recruiting theoretical justifications from RCT and based on hypothesis following theoretical Framework has been developed.

Figure 1. The Theoretical Framework of the study.



Methodology

The study's primary objective was to explore the role of dual nationality, cryptocurrency, and financial system sophistication in money laundering by improving the Walker model. A quantitative research design was employed over a strongly balanced panel dataset to accomplish research objectives. The study's final sample comprised 177 countries. Further annual data of all variables are collected for 11 years (2009 to 2019). The study period is 11 years because the data on financial system sophistication and cryptocurrency was available from 2008. All the variables in the data set were standardized by using the Z-score method before statistical analysis. The detail of the study's variables, data sources, and measurement scale is discussed below in table 1:

Table 1: Details of variables used in the study

S: No	Variable	Proxy/operationalization	scale	Data source
1	Gross Domestic Product (GDP)	GDP Per Capita (GDPPC) (B Unger et al., 2006)	USD (united states dollar)	World Bank databank
2	Bank Secrecy (BS)	Banking Secrecy Laws (BSL) (B Unger et al., 2006)	Measured on a scale from 1 to 4, where 1 means no separate privacy laws and Countries are given a "2" if they are common law countries. Countries that have extra secrecy provisions are given a "3," and countries are given a "4" if they are on FATF, FSF, or OECD black lists.	Financial Secrecy Index and OECD reports
3	Government Attitude (GA)	Government Attitude towards Money Laundering (GATML) (B Unger et al., 2006)	Countries Part of FATF or countries part of FATF, along with other groups, are given a value of 0. Countries part of AML group other than FATF and never on FATF non-corporative list assigned 1. The country was part of no group / on was on the non-corporative list. Still, now a part of a group assigned 2. Countries previously on the FATF non-corporative list are not part of any group given value 3. Whereas Countries currently on the FATF non-corporative list are assigned 4.	FATF website and annual reports.
4	Member of "The Society for Worldwide Interbank Financial Telecommunication" (SWIFT)	SWIFT Transaction record (SWIFTTR) (B Unger et al., 2006)	This variable was measured on a binary scale where 0 means the country is not a member of SWIFT and "1" means the government is a member.	SWIFT annual report and transaction directory.
5	Deposits in Financial System (FD)	Financial system deposits to GDP (FD/GDP) (B Unger et al., 2006)	This variable was measured as % of GDP:	World Bank website.
6	Egmont Group Member (EG)	Egmont Group Member (EG) (B Unger et al., 2006)	This variable was also computed on the binary scale by assigning 0 to	Data is collected from Egmont Group and member countries' websites.

			nonmember countries and 1 to members.	
7	Country Conflict Status (CF)	Country Conflict Status (CF) (B Unger et al., 2006)	0 is given when there has been no conflict since 1989. "1" is given if there was conflict at a minor level and is now terminated. "2" is given if there was conflict at a higher level and now terminated; "3" is given if there is a conflict situation at present; 4 is given if there is an ongoing war situation in any state.	UCDP encyclopedia, by The Department of Peace and Conflict Research.
8	Corruption (CR)	Transparency International Index of corruption perception(CPI)) (B Unger et al., 2006)	A scale of (1=less corrupt) to (5=highly corrupt) was used to compute this variable.1 to 5 scale is a modified version of the original CPI (1 to 10).	Transparency International index.
9	Financial System Sophistication (FSS)	Financial System Sophistication (FSS) (Feldmann, 2013)	A scale from 1 to 7 was employed to estimate this variable. Where 1 means a less sophisticated financial system and "7" means a highly sophisticated system.	World Economic Forum (WEF).
10	Crypto Currency Legality Status (CCLS)	Crypto Currency Legality Status (CCLS) (Thomson Reuter 2008)	It is measured on a scale of 1 to 5. Where "1" means completely banned, and "5" means Cryptocurrency trading is fully legal. 4 means progressing toward equal status for virtual currency, and 3 means Fence-sitters, whereas 2 means Hostile governments that have taken steps to curtail the trading of virtual currencies.	Thomson Reuter website, statista.com, and ciondesk.com
11	Physical Distance (PD)	The real distance between countries(RD) (B Unger et al., 2006)	Distance in KM between countries' capital, which in this case from Islamabad.	Worldatlas.com CIA World Fact Book
12	Language (LA)	Commonly spoken languages between countries (CL) (B Unger et al., 2006)	A binary Scale will be used, "1" will be given to countries with different languages, and 0 will be given to countries with similar languages. In the case of Pakistan, Urdu is the official language, and	CIA World Fact Book www.infoplease.com www.nationsonline.org

			English is a widely used language.	
13	Colonial Background (CB)	Common Colonial Background between countries (CCB) (B Unger et al., 2006)	Countries having similar colonial backgrounds are assigned 0, and countries that do not have similar colonial backgrounds are assigned 1. The colonial Background of Pakistan is British.	Data has been collected from CEPII research and expertise on the world economy, CIA world fact book, and world atlas.
14	Trading Partner (TP)	Country's Trading Partner (TP) (B Unger et al., 2006)	Those countries with the same import or export pattern are assigned 0 and 1 otherwise.	Observatory of Economic Complexity (OEC)
15	Dual Nationality (DN)	Dual Nationality Agreement between countries (DNA) (Leblang, 2015)	A 0 or 1 scale is used to gather data on dual nationality (0 for having a dual nationality agreement, 1 for not having a dual nationality agreement) with Pakistan. Currently, Pakistan has a dual nationality agreement with 19 countries.	The data was obtained from the website of DGIPMIP (Directorate general of immigration & passports ministry of interior Pakistan).

First of all, the dependent variable "UMAI" is computed by using the mathematical formula (1); afterwards, in order to generate results with respect to Pakistan ", DD" is computed, and then the index is reconstructed for Pakistan with the help of incorporation formula. This model has "1" dependent and "15" independent variables. The model is regressed multiple times to generate results overall and with respect to Pakistan. The variables used to compute this dependent variable are the same used as the independent variables in this model. The same variable is used as a dependent variable by (Roman et al., 2021) and (Roman & Schaefer, 2022) to check the predictive capability of the independent variables.

$$UMAI= [GDP] \times [3 \times BS + GA + SWIFT + FD + FSS + CCLS - 3 \times CF - CR - EG + 10] \ldots\ldots (1)$$

$$DD = PD + LA + CB + TP + DN \ldots\ldots\ldots\ldots\ldots (2)$$

In equation 1, UMAI is (updated model attractiveness index), and GDP is (GDP per capita). BS is (Banking Secrecy), GA is (Government Attitude), SWIFT is (SWIFT member), FD is (Financial Deposits), CF is (Conflict), and CR is (Corruption). EG is an Egmont Group member, FSS is Financial System Sophistication, and CCLS is Crypto Currency Legality status. In equation (2), DD is the distance deterrence indicator, PD is the physical distance between countries, LA is language, CB is colonial Background, TP is trade partner, and DN is dual nationality.

$$P(X, y_i) = \frac{1}{\sum_{i=1}^{n}\left[\frac{attractiveness(y_i)}{dist(X, y_i)}\right]} \times \frac{attractiveness(y_i)}{dist(X, y_i)}$$

Here in the above incorporation formula, P in (B Unger et al., 2006) is the amount/ proportion of illegal money moving from country X to country "Y_i" for laundering purposes. In this case, X means Pakistan, and "Y_i" is any other country "i" (i=1.....n all countries of the world). For example, the ratio of money moving from country X (Pakistan) to a government "Y_i" (Algeria) is equal to the "attractiveness" of Algeria, which is weighted by the distance between both countries (Pakistan and Algeria). As stated earlier (B Unger et al., 2006), to make the total share equal to 1, the total "weighted attractiveness" scores for overall countries were corrected.

Next, to explore the role of new variables in money laundering, Feasible Generalized Least Squares (FGLS) regression analysis was conducted using STATA. As (Bai et al., 2021) suggested that an FGLS estimator outperforms the ordinary least squares (OLS) and Generalized Least Squares (GLS) estimates in the presence of heteroskedasticity, serial, and cross-sectional correlations. The dataset of model 1 has also exhibited heteroskedasticity and serial correlation issues. Heteroskedasticity refers to the existence of variance in the error term, and serial correlation refers to the association among variables and their lagged values. The statistical models used in FGLS to accomplish research objectives are:

$$\mathrm{UMAI_{it}} = \beta_1 + \beta_2\,\mathrm{GDP_{it}} + \beta_3\,\mathrm{BS_{it}} + \beta_4\,\mathrm{GA_{it}} + \beta_5\,\mathrm{SWIFT_{it}} + \beta_6\,\mathrm{FD_{it}} + \beta_7\,\mathrm{FSS_{it}} + \beta_8\,\mathrm{CCLS_{it}} + \beta_9\,\mathrm{CF_{it}} + \beta_{10}\,\mathrm{CR_{it}} + \beta_{10}\,\mathrm{EG_{it}} + \mu_{it} \quad \ldots\ldots\ldots\ldots (3)$$

$$\mathrm{DD_{it}} = \beta_1 + \beta_2\,\mathrm{PD_{it}} + \beta_3\,\mathrm{LA_{it}} + \beta_4\,\mathrm{CB_{it}} + \beta_5\,\mathrm{TP_{it}} + \beta_6\,\mathrm{DN_{it}} + \mu_{it} \ldots\ldots\ldots\ldots (4)$$

Where, in equation 3, "$\mathrm{UMAI_{it}}$" = Attractiveness of countries estimated with an updated version, GDP = Gross Domestic Product per capita, BS = Banking Secrecy, GA = Government Attitude, SWIFT=SWIFT member, FD = Financial Deposits, CF = Conflict, CR = Corruption, EG = Egmont Group member, FSS = Financial System Sophistication, CCLS = Crypto Currency Legality status, and in equation 4 "$\mathrm{DD_{it}}$" = Perceived distance of all countries with respect to Pakistan, computed by using the updated version, PD = physical distance, LA = language, CB = colonial Background, TP = trade partner, DN = dual nationality.

Results and discussion

The statistical analysis has generated multiple outputs regarding laundering centres and factors affecting the choice among those centres. For easy understanding, throughout this section, the updated model attractiveness index is referred to as UMA1 and written as UMAII after incorporation. Table 2 reports the descriptive of all variables used to trace the laundering centre and its characteristics.

Table 2: Descriptive of variables used to trace the laundering centre and its characteristics

Variable		Mean	Std. Dev.	Min	Max	Observations
UMAI~s	overall	1764934	4209506	4327.44	5.40E+07	N=1947
	between		4168631	8695.193	4.55E+07	n=177
	within		657470.5	-7689611	1.03E+07	T=11
UMAII~i	overall	0.005703	0.013191	9.00E-06	0.102911	N=1947
	between		0.013101	1.52E-05	0.094692	n=177
	within		0.001808	-0.0225	0.024256	T=11
GDP	overall	14815.68	20747.15	212.137	118824	N=1947
	between		20592.92	263.0804	109796.8	n=177
	within		2926.986	-19048.7	33931.45	T=11
BS	overall	2.012397	1.030717	1	4	N=1947
	between		0.925431	1	4	n=177
	within		0.458675	-0.26033	4.194215	T=11
GA	overall	1.074897	0.783598	0	4	N=1947
	between		0.720342	0	4	n=177
	within		0.312755	-0.9251	3.438533	T=11
SWIFT	overall	0.997417	0.050767	0	1	N=1947
	between		0.034263	0.545455	1	n=177
	within		0.037543	0.451963	1.451963	T=11
CF	overall	0.939566	1.133454	0	4	N=1947
	between		1.04824	0	4	n=177
	within		0.43771	-1.15134	3.485021	T=11
CR	overall	2.831095	1.043689	1	5	N=1947
	between		0.97848	1	4.272727	n=177
	within		0.369878	0.922004	6.103822	T=11
lnFD	overall	3.713071	0.770209	0.816453	6.87955	N=1947
	between		0.682224	1.896476	5.674489	n=177
	within		0.360828	0.997758	6.551457	T=11
EG	overall	0.649793	0.477158	0	1	N=1947
	between		0.4196	0	1	n=177
	within		0.229184	-0.2593	1.558884	T=11
CCLS	overall	3.013946	0.628613	1	5	N=1947
	between		0.391459	1.909091	4	n=177
	within		0.492652	0.923037	5.195764	T=11
FSS	overall	3.379669	1.492185	1	6.44507	N=1947
	between		1.392162	1	5.876646	n=177
	within		0.546367	-0.64362	5.643305	T=11
LA	overall	0.573864	0.494642	0	1	N=1947
	between		0.495925	0	1	n=177
	within		0	0.573864	0.573864	T=11
CB	overall	0.642046	0.479523	0	1	N=1947
	between		0.480766	0	1	n=177
	within		0	0.642046	0.642046	T=11

PD	overall	7189.324	4059.264	373	16642	N=1947
	between		4069.794	373	16642	n=177
	within		0	7189.324	7189.324	T=11
TR	overall	0.9375	0.242124	0	1	N=1947
	between		0.242752	0	1	n=177
	within		0	0.9375	0.9375	T=11
DN	overall	0.911674	0.283842	0	1	N=1947
	between		0.277181	0	1	n=177
	within		0.064299	0.366219	1.548037	T=11

The results generated by FGLS regarding the role of variables in the attractiveness index are exposed in tables 3A, 3B, and 3C. Table 3A exhibits the results of attractiveness index variables (UMAI) before incorporation, whereas Table 3B shows outcomes after incorporation of the attractiveness index and distance deterrence indicator (UMAII). And table 3C contains only the results of variables used in the distance deterrence indicator. From the estimates in table 3A, it is observable that the dependent variables such as GDP, FD, CCLS and FSS are significantly and positively affecting the main independent variables (attractiveness index) with 0.226202, 0.289386, 0.13627, and 0.021808, respectively. These positive and significant coefficients prove that launderers perceive that jurisdiction as more attractive and safe for cleaning their illegitimate funds, which has a stable economy (GDP) and a larger financial system (FD). And also, those countries that are active in adopting cryptocurrency (CCLS) have the most sophisticated financial systems (FSS). (T. P. and J. Walker, 2011) also observed that the sophistication of the financial system is a critical factor in money laundering. Further, in Table 3A, GA, CF, EG and CR were found to be negatively and significantly associated with the attractiveness index with -0.13419, -0.057435, -0.18983 and -0.14819 coefficients, respectively. It reveals that launderers do not find those places on the globe attractive for cleaning their illegal funds, which are prone to any conflict/war situation (CF). And have high levels of corruption (CR), as it increases the risk of losing their funds (Walker, 1999). Launderers also do not feel comfortable laundering their funds in those countries which are a member of the Egmont Group (B Unger et al., 2006). As the Egmont group is the central body of financial intelligence units of all countries, being its member, it has access to international resources for the identification of illegal transactions. Among these four variables, which are negatively associated with the attractiveness index GA (government attitude towards money laundering), walker proposed to have a positive relationship. This negative relationship truly represents the reality that the countries which are found highly corporative to AML standards, are also money laundering centers. Similar remarks are given by (Masciandaro, 2005)**,** who referred to this behaviour of tax heavens as the "false friend effect", which means that these tax heaven countries are the first line for support and development of AML regulation, but in reality, they always remain ineffective (ineffective Implementation) in the fight against ML. There are only two variables (BS and SWIFT) in the table, which were found positively but insignificantly affect the attractiveness index. The insignificant relationship shown by BS can have multiple reasons. Banking secrecy (BS) is a very alluring element for launderers as it increases the level of anonymity. Banking secrecy

was a critical element for launderers when walker proposed its model, but now the era of banking secrecy is close to over (OECD, 2011). Further, Due to international financial bodies' pressure against money laundering, countries are forced to relax their secrecy provisions regarding financial transactions. As exhibited by the descriptive table, it has resulted in moderate secrecy in most countries included in the sample. Pressure from international financial bodies and countries' response towards the relaxation of secrecy provisions has decreased its perceived value to launderers. As far as the insignificance of the variable SWIFT is concerned, data loss variation because all the countries in the world use SWIFT technology for cross-border funds movement (Scott et al., 2017). In short, Table 3A shows that out of 10 variables of the attractiveness index, 7 variables such as (GDP, GA, CF, CR, FD, EG, and CCLS) were significant at 1%, and 1 variable (FSS) was significant at 5 %, and 2 variables (BS, SWIFT) were insignificant. The discussion above regarding CCLS and FSS leads to the acceptance of the following hypothesis.

H1b: *A highly sophisticated financial system generally makes a country more attractive for laundering activities.*

H2b: *The legality of cryptocurrency in an economy generally enhances its Attractiveness for laundering activities.*

Table 3A: Role of Independent Variables in Attractiveness Index (UMAI)

UMAI	**Coef.**	**Std. Err.**	**z**	**P>|z|**	**[95% Conf.Interval]**	
LnGDP	0.226202	0.020813	10.87	0	0.185409	0.266995
BS	0.01288	0.015105	-0.85	0.394	0.04248	0.016724
GA	-0.13419	0.025624	-5.24	0	-0.18441	-0.08397
SWIFT	0.062229	0.352767	0.18	0.86	-0.62918	0.753639
CF	-0.057435	0.017453	3.29	0.001	-0.02322	-0.09164
CR	-0.14819	0.024397	-6.07	0	-0.196	-0.10037
LnFD	0.289386	0.029422	9.84	0	0.231721	0.347051
EG	-0.18983	0.044673	-4.25	0	-0.27738	-0.10227
CCLS	0.13627	0.029065	4.69	0	0.079304	0.193237
FSS	0.021808	0.010563	2.06	0.039	0.001105	0.04251
_cons	-2.92377	0.431234	-6.78	0	-3.76897	-2.07857

Table 3B shows results after incorporation, which means now these variables represent values concerning Pakistan. In Table 20B, we can observe that results remain almost unchanged regarding significance and signs of coefficients even after the incorporation of the distance deterrence indicator with the attractiveness index. Only the variable FSS has become insignificant with the same sign but a reduced coefficient. It means Pakistani launderers do not consider the sophistication of the financial system of any country before selecting laundering centres in the world. It might be because Pakistan has moderately sophisticated financial systems (World Economic Forum (WEF), 2008), and launders found these instruments less compatible with the Pakistani system and more complex in operations. Advanced financial instruments such as derivatives have become too complex for the average person to understand.

Wall Street has also turned to mathematicians and physicists to create models and computer programs that could analyze these exotic instruments (CEOC, 2011). Further Pakistani launderers also might not consider the sophistication of the financial system during the selection of the laundering centre because their objective is cleaning the fund and hiding its origin, not a profitable investment. The basic purpose of the financial system's sophistication is to greater profits over investments (Paun et al., 2019). Most importantly, Pakistani launderers perceive advanced financial products as risky, and due to the risk of losing funds completely, they do not find sophisticated financial systems attractive. The inherent risk of advanced financial instruments has been indicated by multiple sources, such as Warren Buffett, who "has stated regarding advanced financial products such as derivatives that these are financial weapons of mass destruction."

We can conclude from the information presented in table 3A that FSS and CCLS both significantly and positively increase the attractiveness rankings of countries regarding the provision of a laundering environment. But after incorporation, the information presented in table 3B says that only CCLS is an attractive element for Pakistan-based launderers, but not the FSS. Further, coefficients of both variables CCLS and FSS have dropped to (0.090507, 0.00663) in the case of Pakistan from overall results (0.13627, 0.021808), respectively. Only banning its trade in the country is not a solution; proper legislation following FATF recommendations is needed. Further awareness sessions in public, introduction to cryptocurrencies courses in banking, and financial and technical study programs will reduce the risks and dangers attached to digital currencies. Currently, only the Khyber Pakhtunkhwa assembly moved a resolution which is recommended to the Central Government for legislation and regulation of cryptocurrencies. In Pakistan, despite the non-regularization of cryptocurrencies, it is estimated that over 9.0 million people, 4.1% of the total population of Pakistan, currently own cryptocurrency (Ashraf & Khan, 2020); this figure demands proper legislation. The above discussion leads to rejecting the following hypothesis (H1a) and accepting (H2a).

> ***H1a:*** *Highly sophisticated financial system makes a country more attractive for laundering activities from Pakistan.*
>
> ***H2a:*** *The legality of cryptocurrency in an economy enhances its Attractiveness for laundering activities from Pakistan.*

Table 3B: Role of Independent Variables in Attractiveness Index after incorporation

UMAII	Coef.	Std. Err.	z	P>|z|	[95% Conf.Interval]	
LnGDP	0.207473	0.021344	9.72	0	0.16564	0.249307
BS	0.00286	0.01549	-0.18	0.854	0.03322	0.027499
GA	-0.11034	0.026278	-4.2	0	-0.16184	-0.05883
SWIFT	0.078239	0.361765	0.22	0.829	-0.63081	0.787284
CF	-0.116286	0.017898	6.5	0	-0.08120	-0.15136
CR	-0.22064	0.02502	-8.82	0	-0.26968	-0.1716
LnFD	0.263788	0.030172	8.74	0	0.204652	0.322925
EG	-0.17126	0.045813	-3.74	0	-0.26105	-0.08147
CCLS	0.090507	0.029806	3.04	0.002	0.032088	0.148926
FSS	0.00663	0.010832	-0.61	0.541	-0.02786	0.014601
_cons	-2.36141	0.442233	-5.34	0	-3.22817	-1.49465

Lastly, let's look at the outputs of Table 3C. All the variables of the "distance deterrence indicator" significantly affected the attractiveness index after incorporation computed by the updated model (UMAII). The variables PD, LA, CB, TR, and DN with coefficients 5.157418, 0.355185, 0.059437, 0.83397, and 0.729497, respectively, are affected positively. We can infer from the values and signs of coefficients that for Pakistani launderers, the countries nearby are preferable for laundering, as indicated by PD confidence. Further, similar language (LA) and colonial background (CB) increase cultural/social ties and level of comfortableness for Pakistani launderers. TR, with the second-highest coefficient of 0.83397, indicates that the trading relationships of Pakistan with other countries increase their Attractiveness for laundering from Pakistan. Pakistani launders use trade as a preferred medium for laundering (INCSR, 2007). Lastly, the variable DN affects positively and significantly with the third-largest coefficient value of 0.729497 after TR, which means Pakistani launderers prefer those countries with which Pakistan has dual nationality agreements over other countries with which Pakistan does not have dual nationality agreements. Pakistan has dual nationality agreements with 19 countries, out of which "10" countries such as Bahrain, Italy, Switzerland, Denmark, Ireland, Finland, Sweden, United Kingdom, Netherlands, and Belgium fall in the top 30 or highly attractive countries for laundering from Pakistan. Whereas in reaming "9" countries fall in moderately attractive countries. Further, "7" countries (France, Belgium, Jordan, the Netherlands, Switzerland, Ireland, and Bahrain) out of 19 countries with which Pakistan has a dual nationality agreement also Fall on the tax heaven list (Jansky, 2020). Tax heavens are considered one of the biggest facilitators of money laundering activities (Soni, 2008). This discussion regarding the DN variable leads us to accept our following hypothesis.

> ***H3:*** *Dual nationality agreements make a country more attractive for money laundering from Pakistan.*

Table 3C: Role of distance deterrence indicators in Attractiveness Index after incorporation (UMAII)

UMAII	Coef.	Std. Err.	Z	P>|z|	[95% Conf.Interval]	
LnPD	5.157418	0.041557	124.11	0	5.075968	5.238868
LA	0.355185	0.037488	9.47	0	0.281709	0.42866
CB	0.059437	0.037244	1.6	0.111	-0.01356	0.132434
TR	0.83397	0.057508	14.5	0	0.94669	0.72126
DN	0.729497	0.049956	14.6	0	0.631585	0.827409
_cons	-1.8148	0.100491	-18.06	0	-2.01176	-1.61784

Conclusion and Policy Implications

Pakistan has already taken very serious legislative and regulatory steps in response to international AML standards to ensure cooperation with the international community and the fight against money laundering (Butt et al., 2020). But more corporation is demanded by global communities. The study findings benefit policymakers and practitioners in numerous ways to build an effective AML framework and improve corporations with international regulations against AML. The attractiveness index concerning Pakistan can help establish a strategic control system and country-specific AML strategies. The study's outcomes can be used to design effective asset recovery programs. The study findings also guide policymakers and professionals in cryptocurrency regarding the regulation and compliance of this industry with global AML laws. Only banning its trade in the country is not a solution; proper legislation following FATF recommendations is needed. In Pakistan, despite the non-regularization of cryptocurrencies, 4.1% of the total population currently own cryptocurrency (Ali,. Ashraf, Ali, 2020); this figure and the outcome of the study both stress proper legislation. Next dual nationality has been observed as a factor facilitating money, so a complete asset disclosure policy for both officials and public individuals holding dual nationality can be designed. The study shows that dual nationality is critical in money laundering from Pakistan. Lastly, large numbers of AML regulations have already been formulated to protect against the misuse of financial sectors, but the findings of the study reveal that more AML regulations are needed for countries with highly sophisticated financial systems. Lastly, the improvements in the walker model do not change the outcomes completely different from the original version but make it more contemporary (J. Roman & T. Schaefer 2022).

All studies have experienced some level of limitation. The statistical results stated here should also be interpreted by considering some limitations. The primary limitation of this study was the lack of empirical literature in this area. It made each step, from the hypothesis development to the discussion of the results, more difficult. The second limitation was the lack of methodological approaches in panel data sets regarding money laundering. Most importantly, data availability is a critical limitation every researcher must consider before working in this area. Further, the concept and phenomenon of money laundering are developing continuously; therefore, continuous research is essential to fight successfully against money laundering. The most important contribution will be to further update the model (walker model), which is used for this identification. New variables that increase the Attractiveness of laundering places like a country is a "tax haven," and variables that decrease Attractiveness, like "transaction cost", can be added. Along with adding new variables in the walker model, the status of old variables can also be rechecked. As many studies highlighted that banking

secrecy is now over, removing unrelated/ less related variables can also be addressed because in the walker model.

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