MIT805 - Big Data - Assignment 2
Thabo Masilo - u23991314
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Topic: Anti Money Laundering

Anti-money laundering related to Illegal activities often yields substantial profits. Nevertheless, using money from these unlawful sources carries the risk of attracting law enforcement's scrutiny, potentially leading to criminal charges. To enjoy the gains of their wrongdoing without hindrance, criminals must, therefore, hide the illegitimate source of these funds.[1]

For a well-rounded anti-money laundering strategy, it's crucial to include both client information gathering and in-depth investigations at the organizational level when suspicious activities arise.[2] The Authority will establish a permanent committee to combat money laundering and terrorist financing by coordinating efforts to prevent their use of the financial system.[3]

Dataset:

- **Size:** The dataset contains approximately 2 million records of financial transactions.
- **File Name:** Transactions for Anti Money Laundering (AML) - HI-Large Transactions.
- **Format:** The data is provided in a structured tabular format, with 11 columns representing various attributes of each transaction such as the date of the transaction, The Bank Name, Amount, and Currency. The data include an indicator that denotes whether the transaction involves money laundering or not.
- **Age:** The dataset includes transactions that occur over the entire period of six months, from August 2022 to January 2023.
- **Source:** The dataset is obtained from the Kaggle website.

Overview of the Data:

The dataset contains financial transaction details that might be related to money laundering. It includes information like transaction amounts, dates, sender and receiver info, and currency types. This dataset helps identify suspicious patterns and relationships that could signal money laundering.

Collection Procedures:

The organization collecting this data uses both manual and automated methods for monitoring [4]. They flag suspicious transactions by looking at factors like unusually large amounts, frequent transfers between accounts, and transactions involving high-risk countries [5]. Financial experts then closely examine these flagged transactions to spot potential money laundering activities [4].

Payment Method of Transactions and Amount Paid:
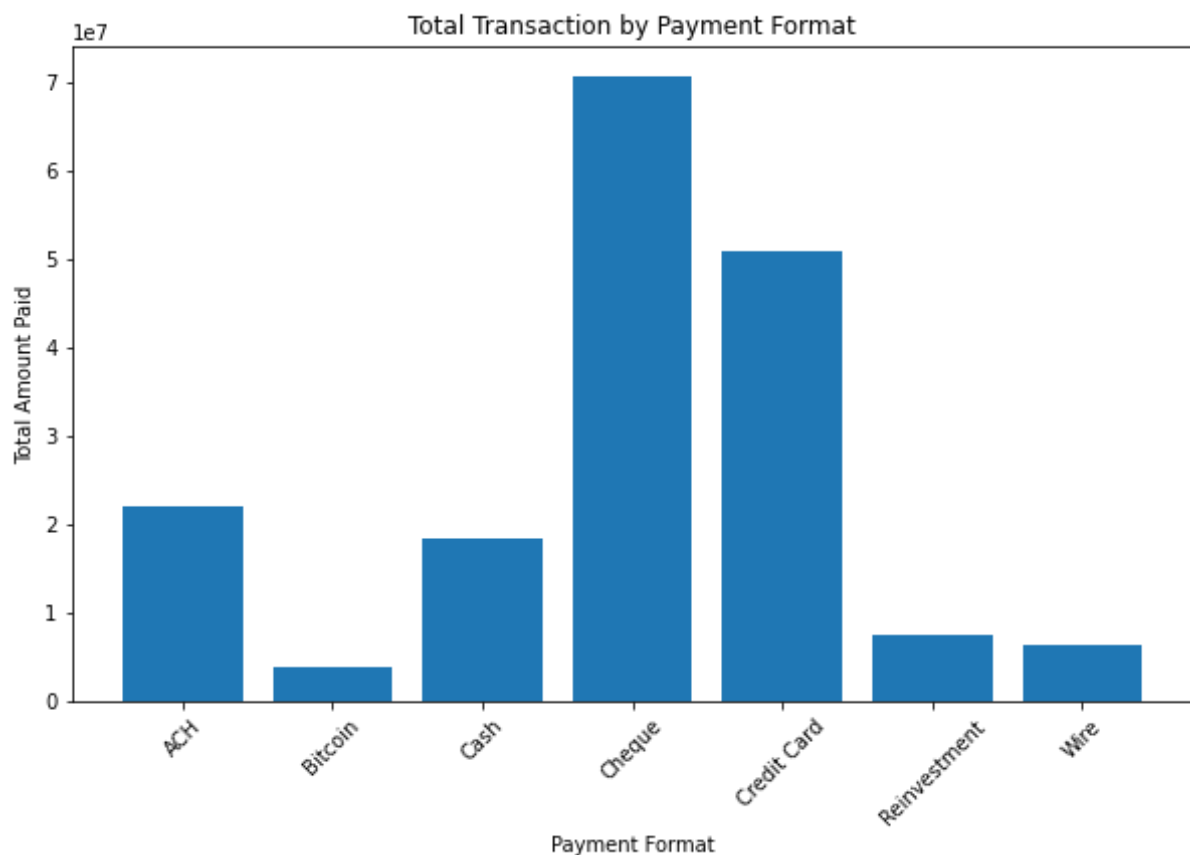
In the dataset, there are seven payment methods for all the transactions, with the highest frequency being "Cheque," followed by "credit card" as the second most frequently used method. Nonetheless, the largest payments originate from Cheque, ACH, and Cash. Even though credit transactions are the second most common in terms of frequency, the accompanying graph reveals that the total amount paid in credit transactions ranks second to last, indicating relatively small payment amounts.
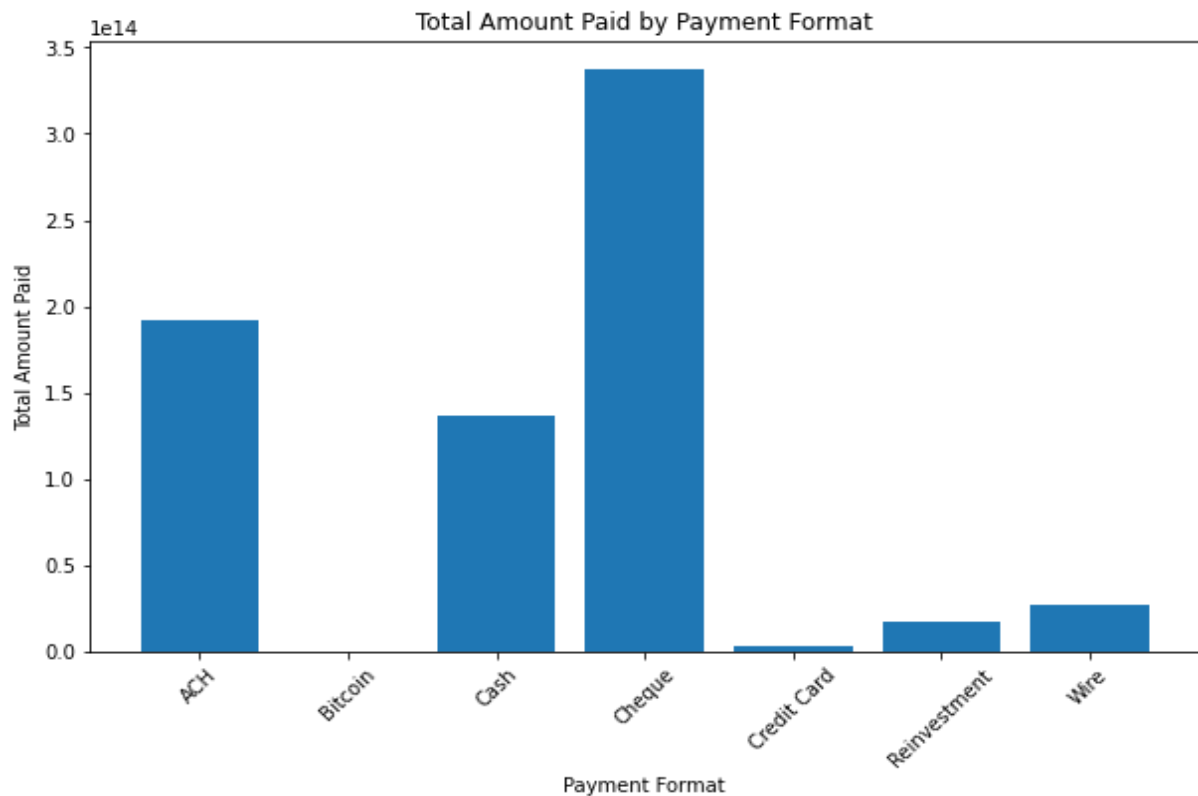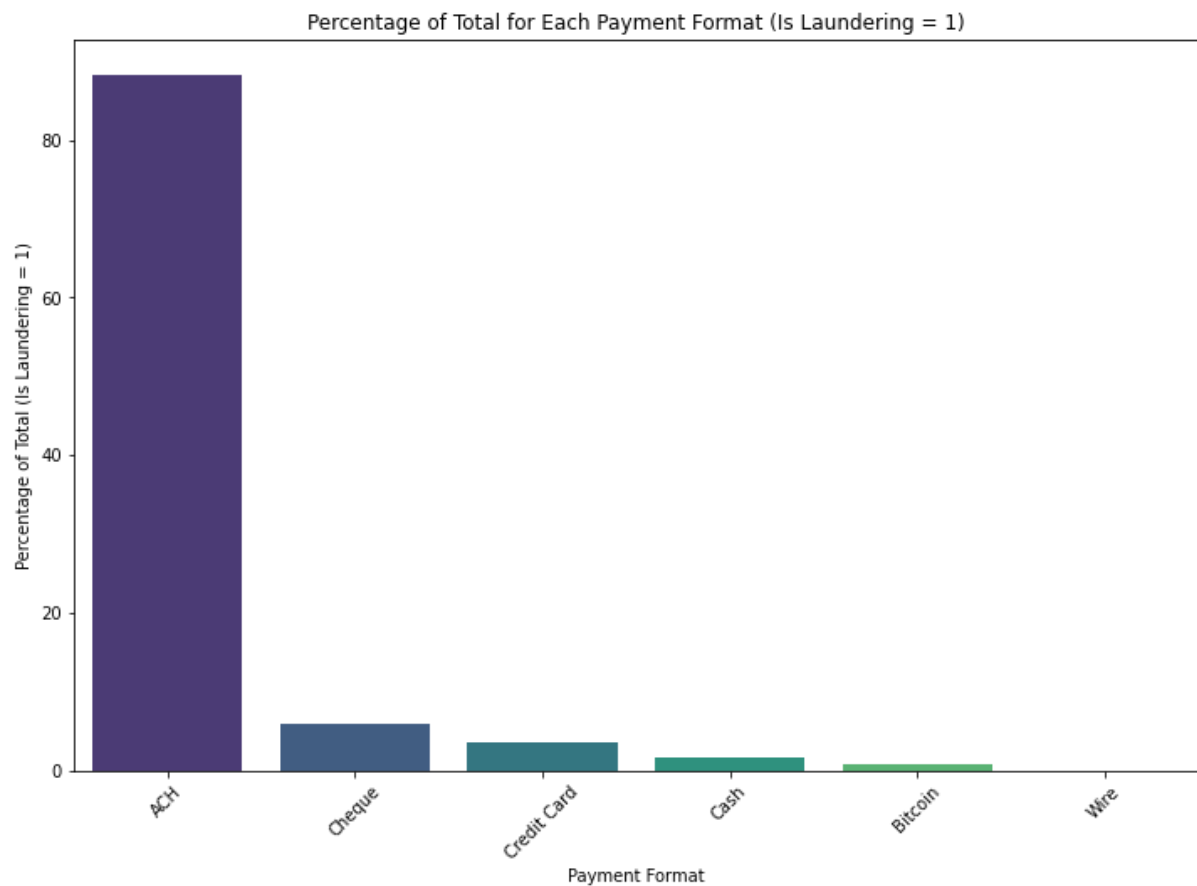
Visualization of Transactions that are Laundering vs Non-Laundering.
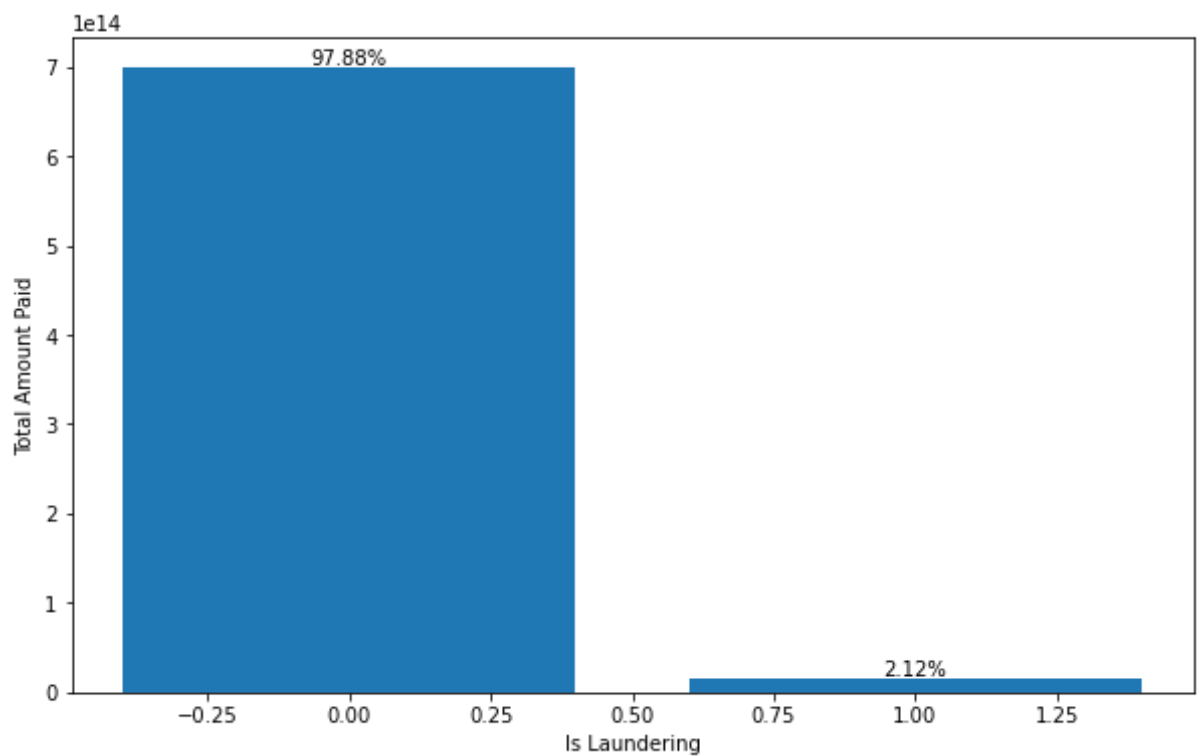
According to the graph above, it seems that only a small fraction, approximately 2 percent, of the transactions are indicative of money laundering.

Visualisation of Laundering Transaction:

Percentage of Total for Each Payment Format (Is Laundering = 1)

Over 80% of money laundering transactions occur using ACH payments. ACH, the Automated Clearing House system, is the main method for electronic funds transfers, enabling electronic deposits in financial institutions and online payments[6].

Visualisation of Payment Currency:

Is Laundering vs Payment Currency for Is Laundering = 1
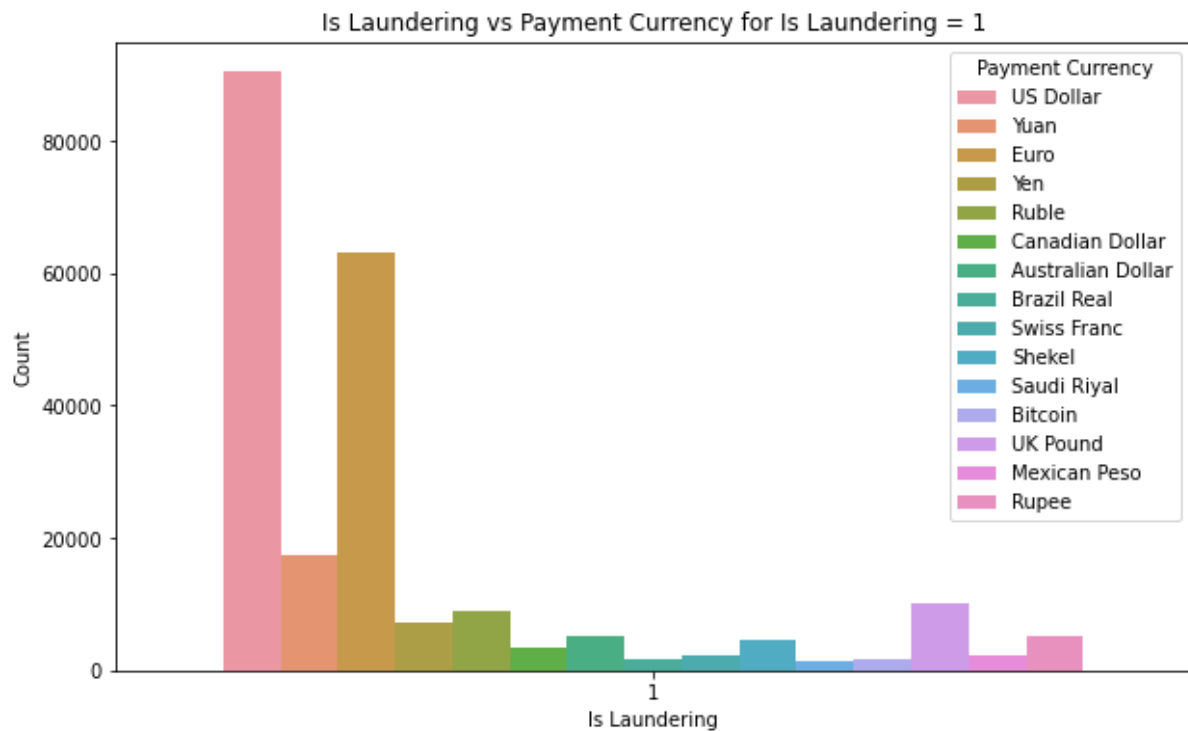
It seems that the majority of transactions related to money laundering are conducted using US Dollars and Euros as the payment currencies.

Percentage of Total by Payment Currency
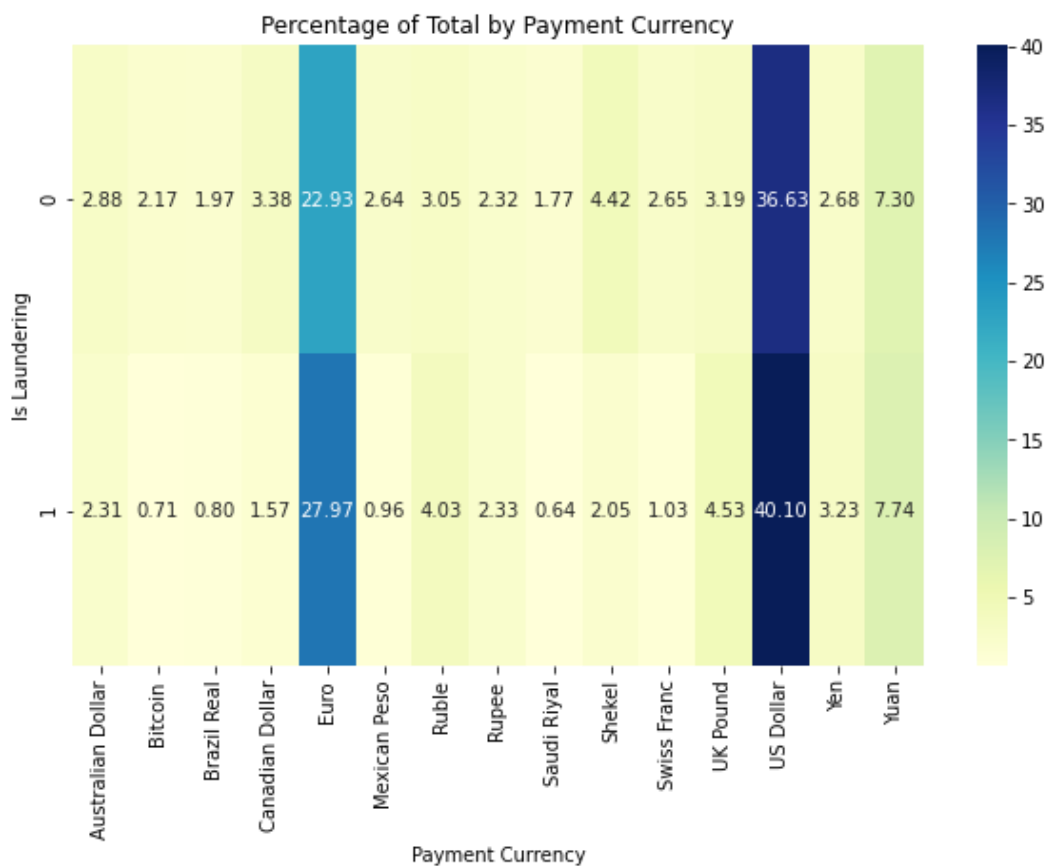
The graph above indicates that 40% of the Money Laundering transactions seem to involve US Dollars, while the same currency is associated with 36% of the Total Non-La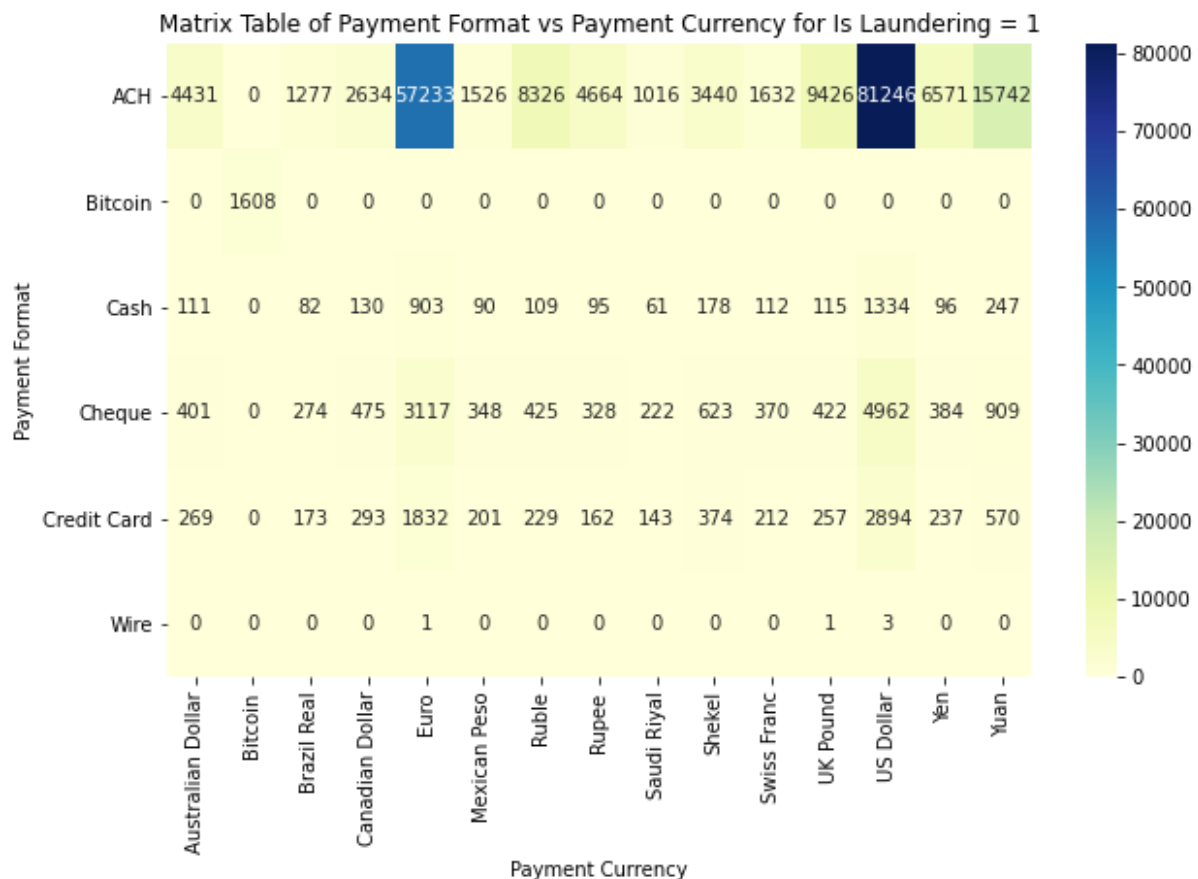undering transactions. Some currencies, such as US Dollars, Euros, Rubles, UK Pounds, Yen, and Yuan, appear to have a higher occurrence in Money Laundering transactions.

Matrix Table of Payment Format vs Payment Currency for Is Laundering = 1

Payment Format	Australian Dollar	Bitcoin	Brazil Real	Canadian Dollar	Euro	Mexican Peso	Ruble	Rupee	Saudi Riyal	Shekel	Swiss Franc	UK Pound	US Dollar	Yen	Yuan
ACH	4431	0	1277	2634	57233	1526	8326	4664	1016	3440	1632	9426	81246	6571	15742
Bitcoin	0	1608	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash	111	0	82	130	903	90	109	95	61	178	112	115	1334	96	247
Cheque	401	0	274	475	3117	348	425	328	222	623	370	422	4962	384	909
Credit Card	269	0	173	293	1832	201	229	162	143	374	212	257	2894	237	570
Wire	0	0	0	0	1	0	0	0	0	0	0	1	3	0	0

The graph above illustrates that a significant portion of Money Laundering ACH payments is conducted using US Dollars, Euros, and Yuan, which rank as the top three currencies. Additionally, there are noteworthy transactions involving ACH payments in Rubles and UK Pounds. Furthermore, the majority of Cheque and Credit Card transactions are denominated in US Dollars.

References list :

1. https://www.imf.org/external/np/leg/amlcft/eng/aml1.htm
2. https://www2.deloitte.com/ch/en/pages/forensics/articles/anti-money-laundering.html
3. https://eba.europa.eu/
4. https://www.kaggle.com/datasets/ealtman2019/ibm-transactions-for-anti-moneylaundering-aml

5. https://home.treasury.gov/system/files/136/2022-National-Money-Laundering-Risk-Assessment.pdf.
6. https://www.fiscal.treasury.gov/