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Is It Necessary to Restrict Forex Financial Trading? A Modified Model

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The Central Bank of Iran banned online currency trading through Forex brokers in November 2016. However, some Iranian speculators still trade in the online Forex market. Is this prohibition on Forex trading reasonable? According to reports, the majority of Forex day traders fail and leave the market within six months to a year. Some scholars attribute this failure to the changeable characteristics of the losing traders, including low startup capital, failure to manage risk, lack of discipline, and impatience. The purpose of this study was to explore why the majority of traders fail and to investigate the relationship between the Forex market features and the risk of failure. We developed a previous model to address this issue. Given the Forex market is a zero-sum game; the break-even point of the representative player was formulated. The model and simulation results indicated that the expected likelihood of loss is directly related to market features such as leverage, volatility, and the frequency of trading. The minimum rate of expected return, high volatile days, and spread were the other factors affecting the risk of loss. In conclusion, the study confirms the extremely high level of risk in Forex trading, which is inappropriate for the majority of individual investors. Moreover, policymakers need to consider the high risk of loss in this market, and some appropriate regulations seem reasonable on the Forex trading.

Keywords: Forex Financial Market, Market Microstructure, Game Theory, Volatility, Regulation.
JEL Classification*:* C60, F31, G10

1 Introduction

The online foreign exchange market or Forex (FX) is the largest global financial market for trading currencies. The FX market is an online, over-the-counter market in which participants can trade 24 hours per day (Geromichalos & Jung, 2018; Ranaldo & Somogyi, 2018). As one of the fastest-growing sectors of financial markets, daily FX volume accounted for $5.1 trillion in 2016 according to the data from the Bank of International Settlements (BIS). Therefore, the daily Forex market turnover is in multiples

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of trading volumes on capital markets (Baruník, Kočenda, & Vácha, 2017). Trading is done worldwide through the internet and interbank networks.

The Central Bank of Iran (CBI) banned online currency trading through Forex brokers in November 2016. However, some Iranian investors still trade in the online FX market. Moreover, Google search indicates that there are over 1,770,000 Persian web pages and internet links to the Forex analysis, training, signaling, and brokerage for Iranian traders. Some users of these web pages may be Iranians residing abroad.

FX market players include international banks, investment institutions, corporations, brokers, exporters, importers, and millions of retail speculators or day traders (Geromichalos & Jung, 2018; Yamada & Ito, 2017). The BIS viewed retail investors as negligible in 2001. However, advances in online and automated trading have led to the establishment of numerous platforms offering even very small retail traders cheap access to FX markets (Petropoulos, Chatzis, Siakoulis, & Vlachogiannakis, 2017; Zhu et al., 2018). By 2010, trading in the retail segment of the FX market was estimated to be $125-150 billion per day (King & Rime, 2010). The retail investors view Forex as a possible investment opportunity and the theoretical stream of behavioral economics reveals that individual investors tend to be overconfident, which can lead to excessive trading or day trading (Barber, Lee, Liu, & Odean, 2008; Barber & Odean, 2000; Odean, 1999; Pikulina, Renneboog, & Tobler, 2017; Richards & Willows, 2018).

According to evidence, the majority of Forex day traders fail and leave the market within six months to a year (DraKoln, 2008; Hayley & Marsh, 2016). The French financial markets regulator, (AMF) also released results of a study in October 2014 (www.amf-france.org). Over a four-year observation period, the AMF found for the clients of the surveyed intermediaries (14,799 active clients) that the rate of clients losing money exceeded 89%, with an average loss of €10,887 per client.

Some scholars and financial analysts attribute this loss to characteristics of losing traders, including low startup capital, failure to manage risk, lack of discipline, impatience, information asymmetry, and lack of expertise (DraKoln, 2008). Some also claim that the loss may be due to weak fundamental and technical analysis and emotional trading. While all of these factors may cause a trader to lose money individually, why do a very high majority of traders lose and why is there a consistent mass failure in the Forex market? Is it possible to reduce the aggregate percentage of losers?

Although some researchers reported that even very experienced traders consistently fail and lose money in the Forex market (Hayley & Marsh, 2016),

to the best of our knowledge, there is little work modeling the failure of the majority of traders in the Forex market. Most scholars have mainly been interested in the analysis of currencies fluctuations and prediction of price patterns in the Forex market (BenSaïda & Litimi, 2013; Dewachter & Lyrio, 2006; Ghosh, Ostry, & Chamon, 2016; Sermpinis, Stasinakis, Theofilatos, & Karathanasopoulos, 2015; Teodor & Bogdan, 2015; Zhu et al., 2018).

Hayley and Marsh (2016) reported a high rate of Forex traders lost money (Hayley & Marsh, 2016). They attempted to analyze the role of experience in trading and found that Forex traders do not learn how to trade better with experience. The authors showed that retail Forex speculators learn about their inherent abilities as traders and respond appropriately. For instance, after an unsuccessful trading day, traders are significantly more likely to cease trading, to trade smaller amounts, and to trade less frequently. Finally, they found that even very experienced traders consistently fail and lose money.

Despite this finding in Forex, empirical evidence supports a considerable learning-by-doing effect in equity markets (Dhar & Zhu, 2006; Feng & Seasholes, 2005). However, Barber et al. (2004) showed that the majority of day traders lose even in the stock market (Barber, Lee, Liu, & Odean, 2004). They found heavy day traders earn gross profits in the Taiwan stock market, but their profits are not sufficient to cover transaction costs. Moreover, in the typical six-month period, more than eight out of ten-day traders lose money, which is less than the Forex market. Barber et al. (2008) claimed that almost all individual trading losses could be traced to the traders' aggressive orders (Barber et al., 2008). Unlike Forex, the stock market is a positive-sum game, and there are some different results on successful and losing traders (Barrot, Kaniel, & Sraer, 2016; Wang, Lee, & Woo, 2017).

DraKoln (2008) reported that 95% of investors fail at futures and Forex (DraKoln, 2008). He presented a guide and claimed that some points might help traders to make their presence among 5% of those who win in trading. The author asserted that these points help traders develop and refine the mental discipline and practical skills needed to ensure trading success. He claimed that his detailed guide would put Forex traders in a better position to use technical analysis, to identify profitable trades, and control risk by utilizing appropriate strategies for each type of opportunity and time frame.

Although some Iranian investors still trade in the online FX market, Iranian researches have paid little attention to the Forex market. However, Tayebi, Moeeni, ~~&~~ and Zamani (2014) developed a model for the loss based on the gambler's ruin problem, and Carlson and Osler (2003). The model can be used to estimation the risk of failure for Iranian Forex traders too. The paper

introduced a discrete model to address the issue. In this new study, we try to develop the previous discrete model into a continuous model. For this purpose, exponential growth functions are used for capital growth and decline.

Moreover the normal distribution is used as a continuous distribution instead of the discrete binary distribution. As well as, the model is modified from several other aspects. These modifications and developments can lead to a continuous and more accurate model. The continuous model offers a stronger theoretical formulation. Besides, it eliminates the possibility of computational errors caused by approximations and rounding. Finally, we stimulated the model and used it to assess the Forex risk.

A great majority of traders are losing in the Forex market (Hayley & Marsh, 2016). Still, there are some key questions which should be answered: What is the exact cause of this widespread loss and mass failure? Is it due to the Forex features or the traders' characteristics? How can it be modeled and explained? Is it possible to reduce the aggregate percentage of losing trades? And, if the failure of the vast majority of traders and the extremely high level of risk in Forex trading are inevitable, what are its consequences for traders and policymakers? This study attempts to address these questions.

Forex market turnover is several times larger than trading volumes on capital markets (Baruník et al., 2017). As a result, in recent decades, the FX market has received considerable attention from researchers. As previously mentioned, despite the huge volume of trading in the online Forex market and the loss of a large majority of traders, little attention has been paid to the mass failure in the Forex market. In this context, we aim to shed light on this issue. The contributions of this study to the literature are twofold: First, we developed a previous discrete model into a continuous model. The model indicated how the percentage of losers is related to market features. Second, we simulate and estimate the model to compare its results with the reported figures. We used the modified model to sensitivity analysis for risk of failure.

The remainder of the paper is organized as follows: Section 2 develops a model and framework for the risk of the failure in the Forex market; the results of the model simulation are presented in Section 3, and conclusions are drawn in Section 4.

2 The Model

Carlson and Osler (2003), indicated that currency traders significantly face the gambler's ruin problem: if they run into a long series of losses, they will shortly be out of a job. Tayebi, Moeeni, and Zamani (2014) attempted to model the risk of the loss in Forex market based on the gambler's ruin

problem. The model can be used to estimate the risk of failure for Forex traders globally or locally.

First, regardless of brokerage, the value and composition of traders' assets may change; the share of some players increases and that of some others decreases, but the aggregate assets of all traders remain fixed. Therefore, the FX market is a zero-sum market. Second, they suppose a representative or average player for Forex traders. Since the Forex is a zero-sum market, for the population of all FX traders, the average probability of a win in each trade is 0.5. The win probability of various players is not the same, but it can be introduced a representative or average player as a trader whose win and failure probability in each trade is the same as the mean probability of win and failure per trade in the market (0.5). Consequently, a market representative player can be used for the analysis of the Forex market. Assessment of the risk of failure for a representative/average player in the market can be at least a measure of the Forex risk.

It is made three simplifying assumptions to facilitate modeling and deduce an appropriate formula. First, it was assumed the mean probability of the loss in the market to be equal to the probability of the loss for the mean/representative player. This assumption must be proved separately, but it is a reasonable assumption and appropriate approximation. As previously mentioned, assessment of the risk of a representative/average player can be at least a measure of the Forex risk.

Second, the representative speculator was considered as a day-trader who performs one trade per day. Third, when a speculator buys currency :(X) by another currency:(Y), the daily return is related to the purchased currency appreciation/depreciation.

$$\mathrm{Vol}_t = \left|\frac{Ex_{t+1}-Ex_t}{Ex_t}\right| \quad (1)$$

where Ex_t, is the exchange rate of X to Y on day t. If purchased currency appreciates, the return is positive; otherwise, the speculator loses some money, and return is negative. The daily volatility of major exchange rates usually is between 0 to 2% and isn't fixed. The mean of Vol_t over a period can be represented by Vol. In what follows, the study has applied Vol instead of Vol_t as a simplifying assumption to facilitate formulation and modeling. The FX traders may lose money because of two other factors: inflation and brokerage. For instance, a broker may exchange Euro versus Dollar (EUR/USD) with the bid price of 1.1401 and ask price of 1.1403 without receiving any other

commission. Thus, this broker receives a commission through the difference of the bid and ask price. The spread rate can be defined as follows:

$$Sp = \frac{Ask - Bid}{Bid} \quad (2)$$

In the given example, the spread rate is 0.000175, which seems too little, but the commission payment in leveraged trading is relatively significant. In this study, the spread of 0.0001 is used as a minimum rate. The effect of inflation on the loss is negligible and was thus omitted. Besides, because of the low volatility of exchange rates, the FX market has a low-profit margin in comparison to other markets. Hence, market brokers provide a popular instrument named leverage, which means borrowing fund and trading with it. Using the borrowed money, a trader can enter into trading up to 100 times more than his/her initial asset.

It is known that employing leverage in the FX trading strategy can be a double-edged sword. When a trader employs a leveraged account, all profits or losses of such leveraged trading are assigned to them. Therefore, the gains and losses of the trader are multiplied by the leverage. If the loss of a leveraged account equals the initial asset of the trader, the trader loses all initial money. Consequently, the account will be automatically closed by the broker. Such cases can be called the sudden death of the trader. When W_i is the initial asset of a trader, then he/she can trade with LW_i as a leveraged account. Thus, the subsequent trader's gain/loss, and his/her brokerage payment are multiplied by L. Is there a risk of losing the entire asset in one trading day? The net profit of the leveraged speculator on winning days is:

$$NetProfit = W_i(\mathrm{L.Vol}_t - \mathrm{L}.Sp) \quad (3)$$

Similarly, the net loss of failure days is:

$$NetLoss = W_i(-\mathrm{L.Vol}_t - \mathrm{L}.Sp) \quad (4)$$

In some cases, daily volatility may be large enough to satisfy the following equations:

$$\begin{aligned}(\mathrm{L.Vol}_t + \mathrm{L}.Sp) &\geq 1\\ (-\mathrm{L.Vol}_t - \mathrm{L}.Sp) &\leq -1\end{aligned} \quad (5)$$

Then, $|NetLoss| \geq W_i$ and the final asset will be:

$$W_f = W_i + NetLoss = (1 - \mathrm{L.Vol}_t - \mathrm{L.}Sp)W_i \leq 0 \quad (6)$$

Therefore, if a trader fails in such high volatile days, he/she will entirely lose and ruin his/her initial asset, and sudden death occurs. If there are only (h) high volatile days during the trading period so that $(\mathrm{L.Vol}_t + \mathrm{L.}Sp) \geq 1$, then failure on any of these days leads to the loss of the entire initial asset. For the mean or representative player, the probability of a win is 0.5 in each trade, and the probability of winning all (h) high volatile days is equal to $(0.5)^{\mathrm{h}}$. Consequently, the probability of sudden death would be:

$$P_{SD} = 1 - (0.5)^h \quad (7)$$

$$P_{NSD} = (0.5)^h \quad (8)$$

There are two possible paths for a mean/representative trader: (1) one failure in high volatile days in which the trader loses his/her entire asset. The probability of this path is shown by P_{SD}; (2) winning all (h) high volatile days; the probability of this path is denoted by P_{NSD}. In path (2), the trader wins all (h) high volatile days, but on other T-h transaction days, the trader may face $n = \mathrm{w}$ winning trades and $n = \mathrm{f}$ failure trades. The probability of exactly $n = w$ winning trades (successes) for the mean/representative trader is:

$$P_w = \binom{T-h}{w}(1/2)^{T-h} \quad ,w = 0,1,\dots,T-h \quad (9)$$

$$T = h + w + f \quad (10)$$

Daily volatilities are not fixed in such (h) volatile days, but the mean of Vol_t over such days can be shown by Vol_h. In this new study, we used geometric (Vol_h) as a simplifying assumption. In the previous paper, they used simple, or arithmetic mean of Vol_t. Since the profit and loss in the market depend on the product of volatilities, the geometric means is more accurate variables. In what follows; the paper is applied geometric mean (Vol_h) instead of different values of Vol_t as a modified assumption. This simplifying assumption can facilitate FX loss formulation and modeling.

In path (2), the trader wins all high volatile days. For other *T-h* transaction days, volatility is less, and the mean of volatility can be represented by Vol_l. In path (2), for a trader using leverage like *L*, his/her asset after *T* transaction days (W_T) will be (Tayebi, Moeeni, & Zamani, 2014):

$$W_T = (1 + L.\mathrm{Vol}_h - L.Sp)^h (1 + L.\mathrm{Vol}_l - L.Sp)^w (1 - L.\mathrm{Vol}_l - L.Sp)^f W_i \quad (11)$$

2.1 The Modified Model

In this new study, we assumed that the trader has a minimum rate of subjective expected return (min-rate). We tried to obtain the break-even point, in which the final value of trader's assets is equal to the initial value plus the minimum rate of expected return. In other words, if a trader's return is less than min-rate, he/she is an unsuccessful trader. We assumed that for investor trading major currencies such as EUR, USD, etc., the minimum rate of expected return is equal to the growth rate of Eurozone or the United States. The growth rate is denoted by AGrate. Considering AGrate, there is a break-even point in which the trader achieves the minimum required wins (w_{min}) to maintain the real value of his/her asset:

$$W_T = (1 + \mathrm{AGrate})W_i \quad (12)$$

And,

$$(1 + L.\mathrm{Vol}_h - L.Sp)^h (1 + L.\mathrm{Vol}_l - L.Sp)^{w_{min}} (1 - L.\mathrm{Vol}_l - L.Sp)^{T-h-w_{min}} W_i = (1 + \mathrm{AGrate})W_i \quad (13)$$

By taking natural logarithms of both sides of Eq. (13) and some calculations, we obtained the minimum required wins as below:

$$w_{min} = \frac{(h-T)Ln(1-L.\mathrm{Vol}_l-L.Sp) - h\,Ln(1+L.\mathrm{Vol}_l-L.Sp) + Ln(1+AGrate)}{Ln(1+L.\mathrm{Vol}_l-L.Sp) - Ln(1-L.\mathrm{Vol}_l-L.Sp)} \quad (14)$$

If the number of wins is less than w_{min}, the trader surely loses some money. Thus, the conditional probability of the loss in the path (2) is equal to the summation of the probabilities of exactly $w = 0$ to w= w_{min} successful trades:

$$P(loss|NSD) = \sum_{w=0}^{\lfloor w_{min} \rfloor} P_w = \sum_{w=0}^{\lfloor w_{min} \rfloor} \binom{T-h}{w} (1/2)^{T-h} \quad (15)$$

In Eq. (15), $\lfloor\ \rfloor$ is the floor under w_{min}, i.e., the greatest integer less than or equal to w_{min}. In path (1), a trader undoubtedly loses, and the conditional probability of the loss is: $P(loss|SD) = 1$. Therefore, the expected probability of the loss can be written as:

$$\text{ExpProb}(loss) = \text{P(SD)}.P(loss|SD) + P(NSD).P(loss|NSD)$$
$$= 1 - \left[(1/2)^h - (1/2)^T \sum_{w=0}^{\lfloor w_{min} \rfloor} \binom{T-h}{w}\right] \quad (16)$$

There is a similar way to explore the risk of failure by developing a continuous model for the likelihood of the loss. A continuous model is desirable, theoretically, and empirically. Besides, it eliminates computational errors and approximations. Thus, in this new study, we attempted to develop a previous discrete model into a continuous model. For this purpose, exponential growth functions were used for capital growth and decline. Moreover, the continuous normal distribution was used instead of the discrete binary distribution. As previously mentioned, in the path (2), a leveraged trader gains by the rate of $(\text{L.Vol}_h - \text{L.}Sp)$ in (h) high volatile days. Moreover, in low volatile days, this trader gains by the rate of $(\text{L.Vol}_l - \text{L.}Sp)$ in $n = \text{w}$ successful trades and loses by the rate of $(-\text{L.Vol}_l - \text{L.}Sp)$ in $n = \text{f}$ unsuccessful trading days. Consequently, his/her asset after T transaction days (W_T) is:

$$W_T = e^{h(\text{L.Vol}_h - \text{L.}Sp)}\ e^{w(\text{L.Vol}_l - \text{L.}Sp)}\ e^{f(-\text{L.Vol}_l - \text{L.}Sp)}\ W_i \quad (17)$$

Thus, the break-even point can be calculated. The minimum required wins can now be shown by w_m:

$$W_T = e^{h(\text{L.Vol}_h - \text{L.}Sp)}\ e^{w_m(\text{L.Vol}_l - \text{L.}Sp)}\ e^{(T-h-w_m)(-\text{L.Vol}_l - \text{L.}Sp)}\ W_i = (1 + AGrate)W_i \quad (18)$$

By taking natural logarithms of both sides of Eq. (18) and some calculations, we obtained the minimum required wins as follows:

$$w_m = \frac{T(\text{L.Vol}_l + \text{L.}Sp) - h(\text{L.Vol}_l + \text{L.Vol}_h) + Ln(1+AGrate)}{2(\text{L.Vol}_l)} \quad (19)$$

Thus, the conditional probability of the loss in the path (2) is:

$$P(loss|NSD) = \sum_{w=0}^{w_m} P_w = \sum_{w=0}^{w_m} \binom{T-h}{w} (1/2)^{T-h} =$$
$$\int_{-\infty}^{u} \frac{1}{\sqrt{2\pi}} e^{-x^2} dx \quad (20)$$

In Eq. (20), binomial PDF is already replaced by the normal distribution and:

$$u = \frac{w_m + 0.5 - 0.5(T-h)}{0.5\sqrt{T-h}} \quad (21)$$

or:

$$u = \frac{w_{min} + 0.5 - 0.5(T-h)}{0.5\sqrt{T-h}} \quad (22)$$

If the number of volatile days is high and numerous, the application of Eq.(21) is appropriate. Otherwise, the Eq.(22) is more accurate and must be used. Therefore, the expected probability of the loss can be written as:

$$\begin{aligned} &\text{ExpProb}(loss) = \text{P(SD)}.P(loss|SD) + P(NSD).P(loss|NSD) \\ &= 1 - (0.5)^h + (0.5)^h\left(\int_{-\infty}^{u} \frac{1}{\sqrt{2\pi}} e^{-x^2} dx\right) \\ &= 1 - (0.5)^h\left(1 - \int_{-\infty}^{u} \frac{1}{\sqrt{2\pi}} e^{-x^2} dx\right) \end{aligned} \quad (23)$$

Both developed models indicate the relationship between the risk of the loss and Forex market features such as leverage (L), volatilities (Vol_l , Vol_h) and the frequency of trading (T). Moreover, the models suggest that the high volatile days (h), spread rate (Sp), and the minimum rate of expected return (AGrate) are other factors affecting failure.

3 The Model Simulation and Discussion

For risk estimation, we simulated and calculated Eq.(5), Eq.(14), Eq.(21), Eq.(22), and Eq.(23) using Matlab software. Daily exchange rates data is extracted from http://fx.sauder.ubc.ca. Table 1 presents some simulation results of the model, and Fig.1 represents the daily volatilities. The selected currency pairs are EUR/JPY, and the period includes transaction days from 1 June 2018 until 31 December 2018. According to the results, when leverage is increased to 1:70 and 1:90, leveraged traders are faced with 1 to 3 high volatile days. The risk of the loss lies between the interval of 66.1% and 98.8%. At leverage like 1:90, the expected percentage of the losers exceeds 98.8%. These results conform to figures reported in the market and demonstrate the explanatory power of the model.

Estimations were repeated using exchange rates for USD/EUR, and the simulation results are summarized in Table 2. Because of the low volatility of selected currency pairs (USD/EUR) in the sample period, there is no risk of sudden death for Forex traders using the leverage from 1:10 up to 1:50. With leverage such as 1:50, the expected probability of loss is 89.4%. Traders using leverage 1:70 and more, had between 1 to 2 high volatile days in the period.

Moreover, the results indicate that with leverage like 1:90, the expected probability of failure exceeds 98%.

We can conclude that the model is robust for analyzing the failure in the Forex market. Besides, the model and the results reveal that the high percentage of losers (i.e., high risk of failure) is directly related to Forex market features. In other words, some features of Forex trading are the main cause of failure in this online market. Thus, the aggregate percentage of losing traders does not decrease by changing the personality traits of some traders. Finally, the results indicate that the failure of the vast majority of traders in the Forex is inevitable and unavoidable.

Fig.2 illustrates the daily volatilities of USD/EUR, and Fig.3 depicts the relationship between leverage and loss in Forex trading. This figure indicates that the likelihood of the loss is concavely approaching to 1. Moreover, the blue line shows the risk of the failure for EUR/JPY trading. Because of higher volatilities, the risk of loss in EUR/JPY trading is more than USD/EUR trading. As long as traders use higher leverage, this result is much stronger. Fig.4 depicts the relationship between volatility and loss in Forex market. While in the discrete model, the probability of loss for non-leveraged investors was calculated as much as 59% (Tayebi, Moeeni, & Zamani, 2014). The modified model simulation shows that the risk of loss is never less than 66%. Therefore, the study confirms the extremely high level of risk in Forex trading, which is inappropriate for the majority of individual investors. In other words, for the majority of retail investors, Forex trading can be a new case of the gambler's ruin phenomenon. Thus, it is strongly suggested that individual investors avoid trading in the Forex market. Moreover, policymakers need to consider the high risk of loss in this market, and some appropriate regulations seem reasonable on the Forex trading.

For financial markets to function effectively, there need to be some regulations that reduce the possibility of systemic or institutional failure, fraud, market manipulation, and the unfair treatment of investors, particularly retail investors. In addition to internal procedures developed by financial markets themselves, it is necessary to develop and implement these regulatory frameworks for financial markets to ensure that business is transacted fairly and traders' money and assets are adequately protected. Financial regulation can subject financial markets to certain requirements and restrictions, aiming to maintain the efficiency, fairness, and integrity of the financial system. Thus, financial regulation plays a vital role in the national economy.

The suggested solution in Forex trading is a currency transaction tax or CCT. This tax can differentiate real trading from speculation. Daily FX

volume accounted for $5.1 trillion in 2016 according to the data from the BIS. It means that in less than one year, currency worth 20 times the global GDP is traded. Of this massive amount, international trade in goods and services, which requires a foreign exchange, accounts for only a small percentage ($9 trillion per year) of the total trading. Exchange rate speculators account for at least 80 percent of the global currency market, and they mostly lose. Tobin and Spahn have examined the possibility of levying an international charge on foreign-exchange transactions as a means to reduce exchange rate volatility and promote international economic stability. Besides, this tax can decrease speculative trading. Tobin's tax was originally intended to penalize short-term transactions in currencies markets. While there is no such global tax structure now, it can be laid out national tax rules. A low tax rate on the Forex market can distinguish between financial operations for normal trading and speculative or noise trading. This tax protects useful trades and reduces speculation. Therefore, official domestic brokers could be allowed to participate in Forex trading. The government obliged the official brokers to receive this tax and pay it to the treasury of Iran.

Table 1
The model simulation; the expected likelihood of the loss in the FX market

Leverage	AGrate	h	P_{NSD}	P_{SD}	Vol_h	Vol_l	w_{min}	$P(loss\|NSL$	ExpProb(los
1	2.44	0	0	1	-	0.00331	74	0.661465	0.661465
20	2.44	0	0	1	-	0.00331	76	0.773314	0.773314
50	2.44	0	0	1	-	0.00331	80	0.92183	0.92183
70	2.44	1	0. 5	0.5	0.01511	0.00322	80	0.934011	0.967005
90	2.44	3	0.875	0.125	0.01264	0.00311	78	0.911185	0.988898

Source: The research findings and: http://fx.sauder.ubc.ca.

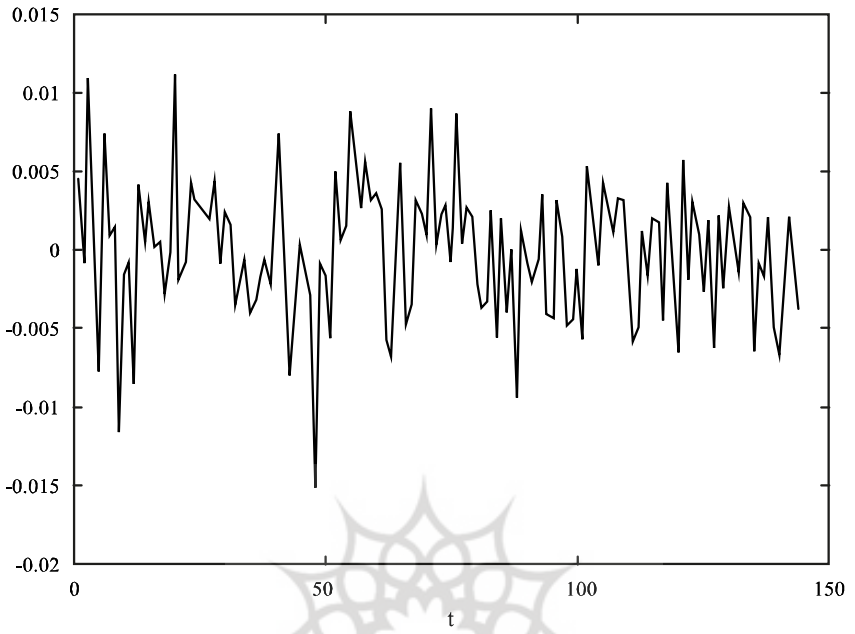

Figure 1. Daily Volatilities.

Source: The research findings and website: http://fx.sauder.ubc.ca.

Table 2

The model simulation; the expected likelihood of the loss in the FX market

Leverage	AGrate	h	P_{NSD}	P_{SD}	Vol_h	Vol_l	w_{min}	$P(loss\|NSD)$	ExpProb($loss$)
10	2.27	0	0	1	-	0.003	75	0.72009	0.72009
50	2.27	0	0	1	-	0.003	79	0.89442	0.89442
80	2.27	1	0.5	0.5	0.01326	0.00293	80	0.93401	0.96701
90	2.27	2	0.75	0.25	0.01246	0.00287	79	0.92328	0.98082
100	2.27	2	0.75	0.25	0.01246	0.00287	81	0.96117	0.99029

Source: The research findings and: http://fx.sauder.ubc.ca.

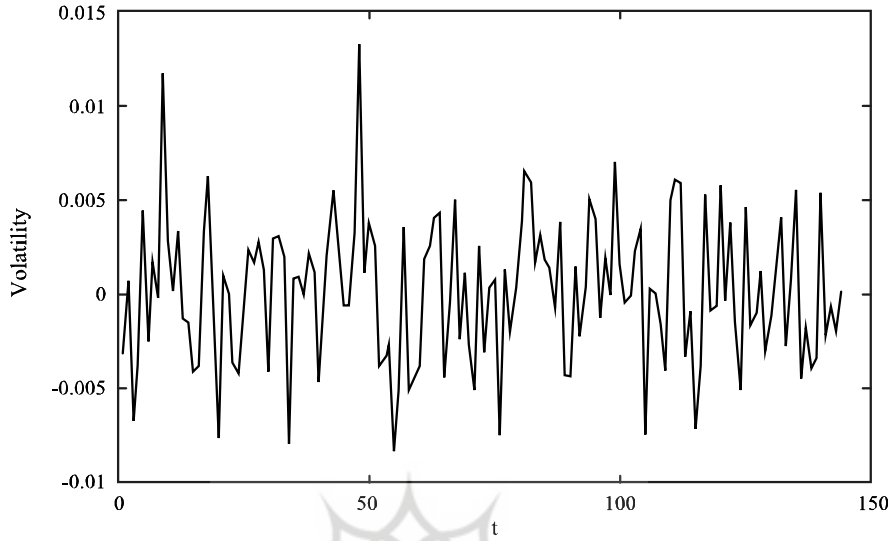

Figure 2. Daily Volatilities.

Source: The research findings and: http://fx.sauder.ubc.ca.

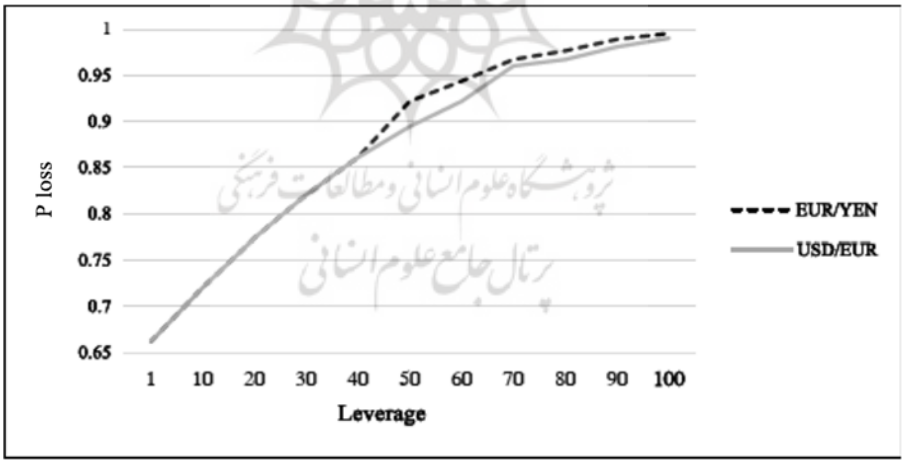

Figure 3. The Relationship between Leverage and Loss.

Source: The research findings

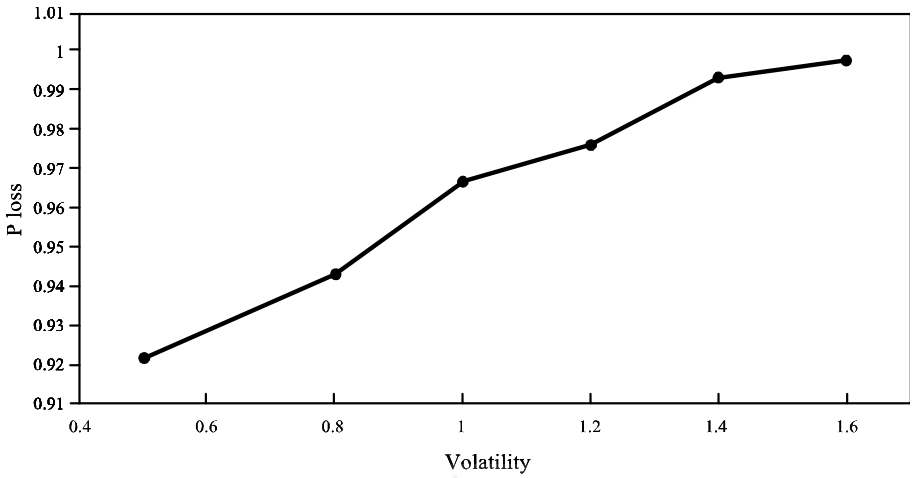

Figure 4. The Relationship between Volatility and Loss.

Source: The research findings

5 Conclusion and Policy Implication

The Central Bank of Iran banned all online currency trading in November 2016. However, some Iranian investors still trade in the Forex market, and they mostly lose. According to evidence, the majority of traders fail in the FX market. Some scholars attribute this loss to the changeable characteristics of losing traders. This study tried to explore why the majority of traders fail. The study modified the previous discrete model into a continuous model to investigate the exact relationship between the loss and FX market features. The continuous model offers a stronger theoretical formulation. Besides, it eliminates the possibility of computational errors caused by approximations and rounding.

The simulation results are highly consistent with reported figures of the market. Although in the discrete model, the probability of loss for non-leveraged investors was calculated as much as 59%, the continuous model shows that the risk of loss will never be less than 67%. Therefore, we can conclude that the model is robust to analyze the failure in the FX market.

The model estimated the risk of losses in the Forex market. From this perspective, the Forex market was analyzed as a global market; the risk of losses for the majority of traders is not limited to a particular country. Due to the international nature of this market and the lack of national information on Iranian traders, empirical study and simulation were not limited to Iran. Due

to the risk factors, there exit high risk of losses for all players in this global market, including Iranian traders. So it can be considered as a high-risk market.

This paper contributes to the literature in three ways. First, the paper develops a continuous model for the risk of failure in the Forex market. Second, the developed model indicates the expected likelihood of failure is directly related to market features like the leverage, the volatilities, and the frequency of trading. Moreover, the minimum rate of expected return, high volatile days, and spread are also effective factors on the likelihood of the loss. Third, the model and results suggest that the failure of the vast majority of traders is the inevitable consequence of specific features of the FX market, even if the personality traits of some traders change.

The study confirms the extremely high level of risk in this type of trading, which is inappropriate for the majority of individual investors. Thus, it is strongly suggested that individual investors avoid trading in this market. Moreover, policymakers' concerns about online Forex trading are valid, and therefore, some appropriate restrictions and regulations seem reasonable and necessary on retail trading in this market. The rules and legal restrictions should be in a way that does not include useful and non-speculative trades.

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