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Would Basket Pegged Currencies Work in Carry Trade?: The Case of Kuwaiti Dinar

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Abstract

This paper examines the profitability of using an emerging market currency that is pegged to a basket of undisclosed currencies in carry trade against floating currencies using conventional, forecasted-based carry trade and the drift factor. Carry trade is known to be a lucrative speculation currency strategy that is popular among all levels of investors ranging from housewives to global hedge funds. It is a strategy where investors take advantage of interest rate differential between two currencies. The secret behind its success is its simplicity, attractive returns, a Sharpe ratio that exceeds that of equity markets, and most importantly the failure of uncovered interest rate parity (UIP). The results of this paper showed that using the Kuwaiti dinar (KWD) in carry trade produced a positive returns and these returns were increased when enhanced with forecasting element and when conducted as a portfolio.

Keywords: Carry trade, Random Walk, Uncovered Interest Rate Parity (UIP), Kuwaiti dinar (KWD), Drift factor, Basket pegged currency.
JEL Classification: E43, F13, F18, F31

1. Introduction

Carry trade is conducted in a 24/7 market with a trading volume that is 12 times more than that of all the world's stock markets combined (Triennial Central Bank Survey, BIS, 2010). Out of the trading volume of the foreign exchange market, only 10% is associated with international trade while the rest is attributed to speculative activities where carry trade is the most popular speculation strategy. Carry trade in its plain vanilla form is conducted by borrowing low-interest currencies and investing in high-interest currencies, taking advantage of the interest rate differential. Carry traders use this strategy to exploit the deviations from the uncovered interest rate parity (UIP) that was first documented by Bilson (1981) and Fama (1984). Due to its simplicity, carry trade was labelled by many researcher such as

Jorda and Taylor (2009) and Reichenecker (2015) as a primitive and a naïve strategy. But despite that, Neely and Weller (2013) showed that there is a growing body of literature indicating that the carry trade has statistically and economically significant positive excess returns and a Sharpe ratio about double that of equity markets. A research conducted by Brunnermeier and Pedersen (2009) found that carry trade returns are less volatile than the returns of stock markets. The research showed that the annualized standard deviation of carry trade returns were 5% compared to 15% for the stock market, resulting in a Sharpe ratio that is double of that of the stock markets. Burnside et al. (2006) using British pound against the currencies of 9 developed countries for the period from 1977 to 2005 found that the realized cumulative return from carry trade was similar to that of the S&P 500, but carry trade produced a Sharpe ratio of 0.20 compared to 0.14 for the S&P 500. Jurek (2014) used the currencies of the G10 countries for the period from 1:1990 to 6:2012 and found that carry trade produced a Sharpe ratio ranging from 0.40 to 0.55. Bakshi and Panayotov (2013) used the currencies of the G-10 currencies for the period from 1:1985 to 8:2011 and found that the average annualized return was between 1.95% to 2.70% with a Sharpe ratio ranging from 0.25 and 0.50. Burnside (2012) found that traditional risk factors used to price stock returns could not explain the returns of carry trade. Brunnermeier and Pedersen (2009) suggests that carry trade returns are a compensation for the risk of market crash due to liquidity constrains. Burnside et al (2011) contributed the returns of carry trade to the peso effect. While, Menkhoff et al (2012) concluded that carry trade returns are a compensation for global foreign exchange volatility exposure. Dimic et al (2016) found that the political risk play a part in explaining carry trade returns. Carry trade is not only used as a speculative strategy, but it is also used for hedging. Pojarliev and Levich (2008) found weak correlation between carry trade returns and other asset classes making carry trade suitable for hedging. They also found that currency investing does not neatly fit into equity market models.

The used of emerging markets currencies in carry trade have been documented to be more profitable than when conducting it using the currencies of developed countries as concluded by Darvas (2009). Bhatti (2012) conducted carry trade using the Pakistani rupee against U.S. dollar, Swiss franc, and the Japanese yen. He found that the annualized average return for the 3 pairs was 14.36% for carry trade compared to an average of 1.90% for the S&P 500, Swiss and Nikkei 225 stock market indices. McKinnon (2012) examined carry trade for the period 2001-2011 using the U.S. dollar as the funding currency against the Brazilian real, Mexican peso, and the Canadian dollar and found that carry trade produced an annual return of 7.9%.

Carry trade Sharpe ratio can be enhanced if it is conducted as a portfolio rather than on an individual currency pairs bases. Burnside et al (2011) and Bakshi and Panayotov (2013) showed that the diversification is carry trade currencies led to a higher Sharpe ratio and decreased volatility. Cenedese et al (2014) conducted two sets of carry trades portfolios, the first portfolio included the currencies of 10 advanced countries while the other had the currencies of the 10 advanced countries plus 12 currencies of emerging countries for the period from 1:1998 to 4:2013. Their results showed that the portfolio of the advanced economies produced a mean annual return of 6.2% compared to 9.9% for the global portfolio, the standard deviation was 11.1% and 9.0% and the Sharpe ratio of 0.558 and 1.1 respectively.

Uncovered interest rate parity (UIP) is a parity condition stating that there should be no profit from interest rate differential between two countries since the expected change in exchange rates should equal to the difference in the interest rate itself. Based on UIP, carry trade strategy should not be profitable since currency movement would neutralize the interest rate differential. But, literature has shown that UIP does not hold especially in the short term as concluded Meredith and Chinn (1998), Fujii and Chinn (2001), and many others. Sy et al. (2009) stated that although carry trade is conducted in short-term periods, most of the times, UIP holds (if it does hold) for periods longer than five years. Adding to carry trades advantage, Remolona and Schrijvers (2003) observed that currencies with high interest rate did not depreciate against the currencies with low interest rate, but at the contrary they tend to appreciate contradicting UIP. That is why many such as Gyntelberg and Remolona (2007) and

Baillie and Chang (2011) describe carry trade as a bet against UIP. Looking at their description of carry trade it can be implied that there is a link between the failures of UIP as seen in equation (1) and profitability.

$$i_x - i_y \neq \frac{S_{t+1} - S_t}{S_t} \quad (1)$$

where i_x is the interest rate on target currency, i_y is the Interest rate on funding currency, S_t is the exchange rate at time t where the target currency is the base currency in the pair, and S_{t+1} is the exchange rate at the end of the operation (at time t+1). Pojarliev and Levich (2008) found that the risk of big movements in the foreign exchange markets may result in a losing positions for carry traders. Moosa and Halteh (2012) stated that, despite the failure of UIP being necessary conditions for a profitable carry trade; it is not a sufficient enough. They argued that big movements in the foreign exchange markets might offset the interest rate differential and might even produce a losing position. So, they link the profitability of carry trade with the satisfaction of equation (2). That is why carry trade tends to perform well during low exchange rate volatility periods as concluded by Bhansali (2008).

$$i_x - i_y > \frac{S_{t+1} - S_t}{S_t} \quad (2)$$

Leverage is an essential feature of carry trade as described by Liu et al (2012). Darvas (2009) conducted a study covering the period from 1976 to 2008 and found that well-diversified highly leveraged carry trade portfolios produced an annualized return reaching 46% compared to 5% for less leveraged carry trade. But, at the same time, warned about the catastrophic consequences of excessive leveraging during high volatility periods. Gagnon and Chaboud (2007) characterised leveraging in carry trade as a double-sided sward as it can magnify the losses as well as gains.

It has been concluded by many researchers such as Jorda and Taylor (2009), Moosa (2010), Schmidbauer et al. (2010), Li (2011), Moosa and Halteh (2012) and others that embedding a forecasting element in the decision-making process tends to enhance the risk-adjusted returns. Corte et al. (2009) concluded that there is a significant economic benefit from exploiting the deviation from UIP when forecasting currency returns. Li (2011) found that carry trade returns and risk-return measures can be enhanced by using forecasts methods for exchange rates. Bhatti (2012) found that the interest differential is not the only factor determining return on carry trade and that the expected change in the exchange rate of the funding against the target currency over the holding period also is also a determining factor.

Based on their original paper, Meese and Rogoff (1983) used the random walk model both with and without drift to predict changes in the exchange rate. They concluded that no model can outperforms the random walk in terms of magnitude of error measures. They also found that the regression forecasts from structural form models are never significantly superior to a driftless random walk model and that no economic model for exchange rate forecasting could out-forecast a zero-drift random walk (Meese and Rogoff, 1988). Moosa and Burns (2013) exhibited that the choice between random walk with and without drift can have significant consequences in forecasting outcome. They concluded that if the drift factor is significant, then using a random walk without drift means that the naïve model suffers a loss of information relevant to predicting the dependent variable. The reason is that the random walk without drift does not predict any change and therefore has no direction accuracy, whereas the random walk with drift predicts the direction of change correctly on at least some occasions. They conducted a study using four currencies which are U.S. dollar (USD), Japanese yen (JPY), Canadian dollar (CAD) and British pound (GBP). They concluded that consideration of statistically significant drift in the decision making process led to an improvement in carry trade returns, standard deviation and Sharpe ratio.

2. Methodology

Conventional Carry Trade

In conventional carry trade, carry trader's base their decisions on the interest rate differential as the sole selection criteria. This naïve strategy has proven to be rewarding in most cases despite its simplicity. This operation works as follows.

Let i_x and i_y be the interest rates for currencies *x* and *y*, respectively. In addition, let *S* be the spot rate between the two currencies measured as one unit of *y* against *x*, so appreciation of *y* against *x* would result in a higher *S*, and vice versa. Under conventional carry trade, carry traders would go long currency *y* and short currency *x* if $i_y > i_x$ and vice versa. In this case the return on carry trade is given by;

$$\pi = \frac{S_{t+1}}{S_t}\left(1 + i_y\right) - \left(1 + i_x\right), \tag{3}$$

which can be rewritten as

$$\pi = \left(i_y - i_x\right) + \dot{S}_{t+1} \tag{4}$$

Where $\dot{S}_{t+1}$ is the percentage change in the exchange rate between *t* and *t*+1. The carry trade operation is implicitly based on the assumption of random walk without drift (Moosa, 2004), which means that $\dot{S}_{t+1}$= 0. Thus, carry trade is profitable as long as $\left(i_y - i_x\right) > -\dot{S}_{t+1}$. (That is, as long as the interest rate differential is larger than the depreciation of currency *y* against currency *x*.)

Because of the changes in interest rates differential, it is necessary to switch the role of the currencies, so the general formula for calculating the rate of return on the carry trade will be as follow:

$$\pi = \begin{cases} (i_y - i_x) + \dot{S}_{t+1} & if \quad i_y > i_x \\ (i_x - i_y) - \dot{S}_{t+1} & \quad\;\; i_y < i_x \end{cases} \tag{5}$$

Forecasting-Based Carry Trade

The forecasting-based strategy is conducted in the same manner as conventional carry trade, except that in a forecasting-based strategy the forecast percentage change in exchange rate is taken into consideration. In order to forecast the exchange rate, the monetary model is used because Moosa (1994), Tawadros (2001) and others conclude that "the monetary approach equations also turned in a good performance," as Husted and MacDonald (1999) state. While carry trade uses the interest rate differential as the only criterion for conducting the strategy, the forecasting-based strategy takes into account both the interest rate differential and the expected percentage change in the exchange rate.

In the case of the forecasting-based strategy, the forecasted exchange rate is taken into consideration and used to calculate the expected return. So, we go long on *y* and short on *x* if

$$\left(i_y - i_x\right) + \dot{S}^e_{t+1} > 0 \tag{6}$$

On the other hand, we go long *x* and short *y* when

$$\left(i_x - i_y\right) - \dot{S}^e_{t+1} > 0 \tag{7}$$

In that case, the expected return (π^e) is

$$\pi^e = \begin{cases} \left(i_y - i_x\right) + \dot{S}^e_{t+1} & if \quad (i_y - i_x) + \dot{S}^e_{t+1} > 0 \\ \left(i_x - i_y\right) - \dot{S}^e_{t+1} & \quad\;\; (i_x - i_y) - \dot{S}^e_{t+1} > 0 \end{cases} \tag{8}$$

Where $\dot{S}^e_{t+1}$ is the expected or forecasted percentage change in the exchange rate. Following Moosa and Halteh (2012), $\dot{S}^e_{t+1}$ is generated in-sample from the monetary model of exchange rates. Somanath (1986) found that a monetary model with a lagged endogenous variable forecasts better than the naive random walk model. MacDonald and Taylor (1993, 1994) also claim some predictive power for the monetary model. MacDonald and Taylor (1993) examine the monetary model of the exchange rates for the German mark and the U.S. dollar over the period 1:1976 to 12:1990 and found that a dynamic error correction model outperforms the random walk at every forecast horizon. Using a multivariate cointegration technique, MacDonald and Taylor (1994) also found that an unrestricted monetary model outperforms the random walk and other models in an out-of-sample forecasting experiment for the pound-dollar exchange rate. The monetary model is specified as

$$s_t = \alpha_0 + \alpha_1(m_{x,t} - m_{y,t}) + \alpha_2(y_{x,t} - y_{y,t}) + \alpha_3(i_{x,t} - i_{y,t}) + \varepsilon_t \quad (9)$$

Where s is the natural log of the exchange rate, m is the natural log of the money supply, y is the natural log of the industrial production, i is the nominal interest rate, ε is the error term. x and y refer to the countries whose currencies are involved—here, country y will have its currency as the base currency in the exchange rate. The in-sample forecast of the log exchange rate is

$$s_t^e = \hat{\alpha}_0 + \hat{\alpha}_1(m_{x,t} - m_{y,t}) + \hat{\alpha}_2(y_{x,t} - y_{y,t}) + \hat{\alpha}_3(i_{x,t} - i_{y,t}) \quad (10)$$

Where $\hat{\alpha}_0$ is the estimated value of α_0 and so on. To convert the log forecast exchange rate to the level of the level of the exchange rate, we have

$$S_{t+1}^e = exp\ (s_{t+1}^e) \quad (11)$$

$\dot{S}_{t+1}^e$is equal to $(S_{t+1}^e/S_t) - 1$, which can be used to calculate expected return, π^e. At the end of the operation, the actual return would be

$$\pi = \begin{cases} (i_y - i_x) + \dot{S}_{t+1} & if \quad (i_y - i_x) + \dot{S}_{t+1}^e > 0 \\ (i_x - i_y) - \dot{S}_{t+1} & \quad\quad (i_x - i_y) - \dot{S}_{t+1}^e > 0 \end{cases} \quad (12)$$

The Kuwaiti dinar (KWD) is a currency that is pegged to a basket of currencies without revealing the components of the basket, the reason for that is to limit speculation on the exchange rate. To maintain the exchange rate arrangement, the Central Bank of Kuwait (CBK) must intervene in the market by buying and selling the U.S. dollar (Moosa and Al-Loughani, 1999, 2000). If expectations are predominantly extrapolative, and if the KWD is under pressure, then the CBK may find itself facing an unstable foreign exchange market. If this is the case, then the CBK may be unable or unwilling to defend the KWD by buying and selling currencies, and it may resort to devaluation. This is exactly what happened in 1986, when the CBK resorted to (undeclared) devaluation following the exposure of the KWD to severe pressure arising from persistent capital outflows. The idea here is very simple: if expectations had been regressive, market forces would have done the job for the CBK. Based on Business Intelligence's Middle East report (2007), Marios Maratheftis, an emerging markets currencies analyst at Standard Chartered in London, thinks that the Kuwaiti dinar basket is made up of 70% U.S. dollars, 20% euros, 5% pound, and 5% Japanese yen, and so does Steve Brice, regional head of research at Standard Chartered Dubai. In order to determine the components of the basket, the log (KWD/USD) is used as the dependent variable and the logs of exchange rates of major currencies against the U.S. dollar as the explanatory variables. The equation is specified as

$$s(KWD/USD) = \alpha_0 + \alpha_1 s(EUR/USD) + \alpha_2 s(JPY/USD) + \alpha_3 s(GBP/USD) + \alpha_4 s(CHF/USD) + \varepsilon \quad (13)$$

where $s(KWD/USD)$ is the log of the KWD/USD exchange rate and so on, ε is the error term and the alphas are parameters that reflect the weights. Equation (13) tells us that the Central Bank of Kuwait calculates the KWD/USD rate by using a formula similar to this equation where the coefficients reflect the weights of the individual currencies in the basket. This equation is identical to the equation used by the IMF to calculate the exchange rate of the SDR (Moosa, 2016). The RHS variables are contemporaneous, not lagged, because the KWD/USD rate is calculated (by the central bank) every morning on the basis of the exchange rates available then. Equation (13) is identical to the equation used by the IMF to calculate the exchange rate of the SDR.

The monetary model is used to forecast the USD rate against other major currencies, then the KWD forecast exchange rates against other currencies are calculated as cross rates. The forecast log exchange rate from equation (13) is

$$\hat{s}_{t+1}\,(KWD/USD) = \hat{\alpha}_0 + \hat{\alpha}_1 s(EUR/USD) + \hat{\alpha}_2 s(JPY/USDS) + \hat{\alpha}_3 s(GBP/USD) + \hat{\alpha}_4 s(CHF/USD) \quad (14)$$

To find the forecast level of the KWD/USD exchange rate, we have

$$\hat{S}_{t+1}\,(KWD/USD) = exp\ (\hat{s}_{t+1}\,(KWD/USD)) \quad (15)$$

Which can be used to calculate the expected rate of return in the forecasting-based strategy.

The Drift Factor

The random walk with drift is specified as

$$\dot{\mathrm{S}}_{\mathrm{t}} = \emptyset + \varepsilon_{\mathrm{t}} \quad (16)$$

Where $\emptyset$ is the drift factor and ε_t is the error term, which can be estimated by running a OLS regression on the percentage change in the exchange rate on a constant. The drift factor is then tested for statistical significance. If the drift factor is statistically significant, then it is taken into consideration. In that case, the selection process will be as follow;

$$\pi = \begin{cases} (i_y - i_x) + \emptyset & \\ (i_x - i_y) - \emptyset & \end{cases} if \quad \begin{matrix} (i_y - i_x) + \emptyset > 0 \\ (i_x - i_y) - \emptyset > 0 \end{matrix} \quad (17)$$

The holding period for the carry trade position in that case will not be monthly, but it will be based to the period that produces a statistically significant drift factor at the 95% confidence level. This strategy will be called modified carry trade for the rest of the paper.

Data and Empirical Results

The data used in this paper were obtained from the International Financial Statistics (CD-ROM) and Reuters DataStream terminal. The empirical results presented are based on six currency combinations involving the Kuwaiti dinar (KWD), the Japanese yen (JPY), the British pound (GBP), the Korean won (KRW), the Singaporean dollar (SGD), the Canadian dollar (CAD), and the Swiss franc (CHF). Monthly data were used for the period from 1:2001 to 12:2011.

Table 1 shows that, on an average, the annual mean return has increased, as a result of embedding the forecasting element into the decision making process, in five out of the six pairs under study. While under conventional carry trade, four pairs produced positive mean returns with CAD/KWD and CHF/KWD producing negative mean returns. The pair with the highest improvement was the CHF/KWD where the increase was 3.43%. On the other hand, the returns on the GBP/KWD were reduced as a result of using the forecasting model. The average improvement for the five pairs was 2.13%, while the mean return was reduced by 1.40% for the GBP/KWD. In terms of cumulative returns, SGD/KWD produced the highest cumulative returns in both conventional and forecasted-based carry trade. The pair produced cumulative return of 22.13% under conventional carry trade compared to 61.82% under the forecasting-based method. CHF/KWD had the most improvement of 50.36%, -10.55% to 39.81%, when forecasting technique was used.

In terms of risk, the use of the forecasting models resulted in a reduction in volatility where slightly reduced in five out of the six pairs. The only exception was the GBP/KWD where the volatility increased from 24.72 to 24.78 after using the forecasting methods, while SGD/KWD had the highest reduction from 13.31 to 12.58. The Sharpe ration is widely used by investors to evaluate the risk-adjusted returns. The results show that the Sharpe ratio has increased by an average of 0.103 for five pairs and for the GBP/KWD was reduced by 0.056. The highest increase in Sharpe ratio was for

SGD/KWD from 0.096 under conventional carry trade to 0.30 under the forecasting-based carry trade. Value-at-Risk (VaR) was also improved in both the 95% and the 99% confidence levels for all pairs except for the GBP/KWD.

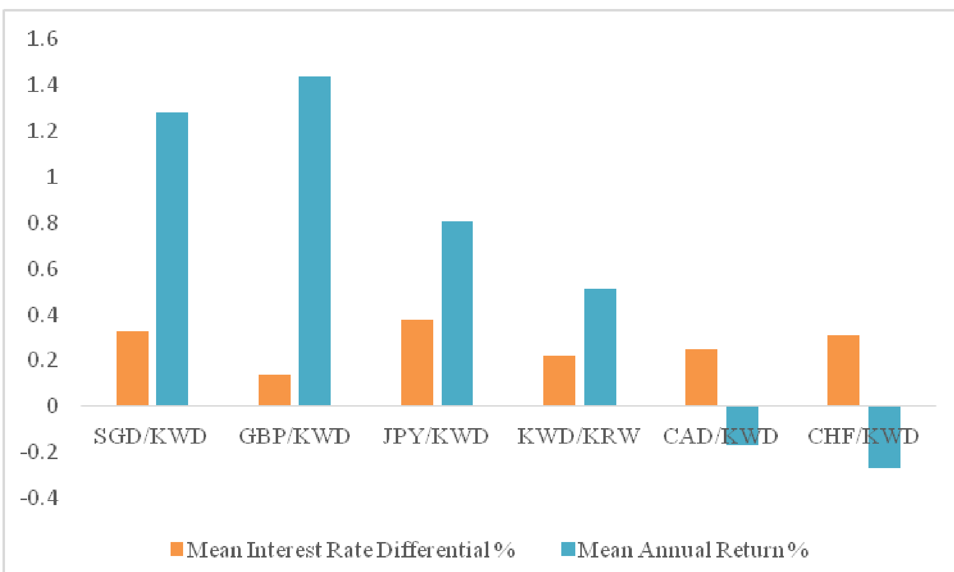
Table 1: Individual Currency Pairs Results

	SGD/KWD		GBP/KWD		JPY/KWD		KWD/KRW		CAD/KWD		CHF/KWD	
Mean Interest Rate Differential %	0.33		0.14		0.38		0.22		0.25		0.31	
Direction Accuracy %	62.82		54.49		48.08		57.05		50.64		50	
	CT	**FB**	**CT**	**FB**	**CT**	**FB**	**CT**	**FB**	**CT**	**FB**	**CT**	**FB**
Mean Annual Return %	1.28	3.78	1.44	0.04	0.81	1.83	0.51	3.22	-0.17	1.84	-0.27	3.16
Cumulative Return %	22.13	61.82	21.64	-2.79	6.77	21.95	1.87	44.93	-4.97	23.52	-10.55	39.81
Standard Deviation	13.31	12.58	24.72	24.78	27.02	26.98	29.45	29.28	23.17	23.10	37.63	37.50
Sharpe Ratio	0.096	0.30	0.058	0.002	0.03	0.068	0.017	0.11	-0.007	0.080	-0.007	0.084
VaR 99%	2.64	2.35	4.11	5.46	5.25	3.60	6.39	3.71	4.30	2.96	6.43	4.82
VaR 95%	1.42	1.25	2.89	3.70	4.18	3.20	5.04	2.91	3.59	2.42	5.92	4.45

CT is the conventional carry trade, while FB is the forecasting-based carry trade.

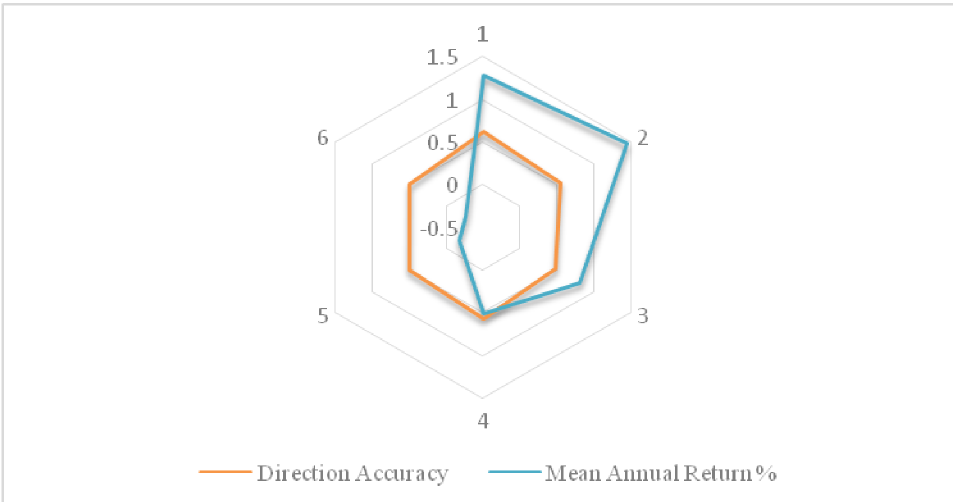
Carry traders pursue currency pairs with the highest interest rate differential, implying that there is a direct relation between interest rate differential and returns. It can be seen in figure 1, that while GBP/KWD had the lowest interest rate differential it produced the highest mean return. Also, it can be seen that although CAD/KWD and CHF/KWD had a positive interest rate differential, they produced negative mean returns. These findings support Moosa (2008), Moosa and Halteh (2012) and AlAli (2016) that there is no clear-cut relation between interest rate differential and carry trade returns.

Figure 1: Interest Rate Differential vs. Mean Return



Abhyankar et al. (2005) associated the ability to predict the direction of change with ‘economic value’, which is a general term for profitability. Engle and Hamilton (1990) and Moosa and Burns (2012) argued that there is a positive relation between direction accuracy and carry trade mean return. Moosa (2014) conducted a simulation exercise to demonstrate that directional accuracy is indeed more strongly correlated with profitability than the root mean square error (RMSE), which is the random walk. To examine the relation between direction accuracy and mean return an OLS regression between mean return as a dependent variable and direction accuracy as the independent variable was conducted. The results showed a positive relation with R^2 of 0.559 but the relation was statistically insignificant with a P-value of 0.249. The results obtained in this paper supports Engle and Hamilton (1990) and Moosa and Burns (2012) findings that there is a positive relation between mean return and direction accuracy. But, the results shown in this paper also show that this relation is statically insignificant in both 99% and 95% confidence levels.

Figure 2: Relation between Direction Accuracy and Mean Returns



Following Darvas (2009) an equally weighted portfolio was constructed, and the results are presented in table 2. The results compare the mean return, standard deviation, Sharpe ratio, and Value-at-Risk of the portfolio with the S&P 500 and the average of the six pairs. In terms of mean returns, it can be seen that the stock market produced the highest annual mean return of 1.87%, compared to 0.60% and 0.724% for both the average and the portfolio respectively. This finding contradicts Jurek (2014) and others that carry trade produces returns that are similar to that of the equity markets. Performing carry trade as a portfolio resulted in huge reduction in volatility from 25.88 for the average of the six pairs to 9.98 for the portfolio. As a result of the reduction in volatility, conducting carry trade through an equally weighed portfolio produced a Sharpe ratio that is double of that of the S&P 500 which confirms Brunnermeier and Pedersen (2009) findings. In terms of value at risk, they were both reduced as a result of conducting carry trade as a portfolio.

Table 2: Carry Trade Portfolio

	Average	S&P 500	Portfolio
Mean Annual Return	0.60	1.87	0.724
Standard Deviation	25.88	54.72	9.98
Sharpe Ratio	0.023	0.034	0.073
VaR 95%	3.84	6.99	1.31
VaR 99%	4.85	10.1	1.73

Table 3 shows the results of the OLS regression in determining the drift factor statistical significance. It can be seen that out of the six pairs under study, only four pairs had a statistically significant drift factor at the 95% confidence level. Interpreting the results, for example the exchange rate of SGD/KWD is expected to fall by 0.15% in three months.

Table 3: Statistical Significance of Drift Factor

Pair	Period in months	Coefficient	t-Stat	P-value	Significance	Estimated drift for the period
SGD/KWD	3	-0.0015	2.045*	0.043	Yes	-0.15%
GBP/KWD	1-12	-	-	-	No	-
JPY/KWD	5	-0.0046	2.150*	0.033	Yes	-0.46%
KWD/KRW	1-12	-	-	-	No	-
CAD/KWD	4	-0.0035	2.248*	0.026	Yes	-0.35%
CHF/KWD	4	-0.0041	2.017*	0.045	Yes	-0.41%

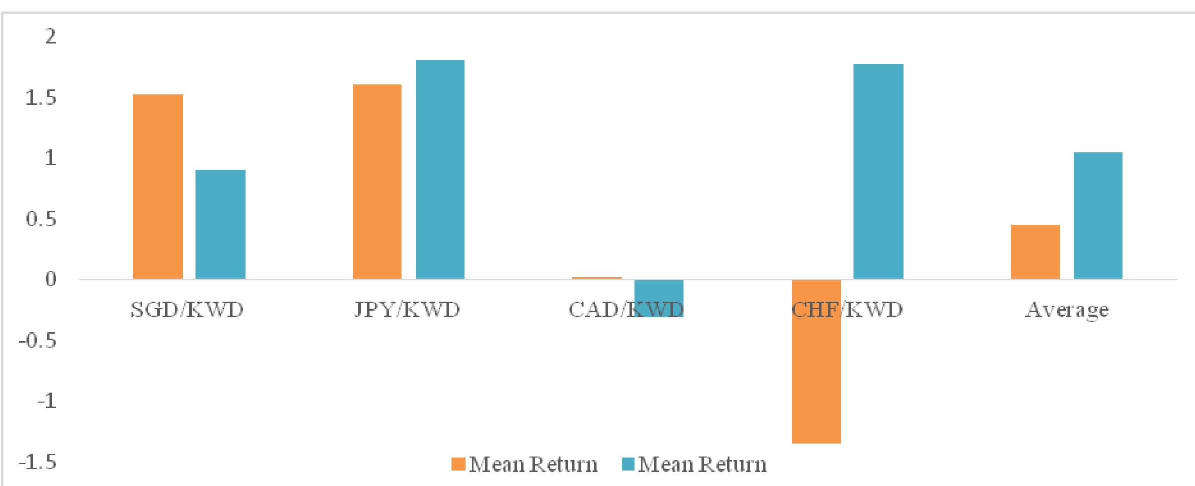
* Statistically significant at the 95% confidence level. The critical value of the t statistics is 1.96.

Results presented in table 4 shows that, on an average, considering the drift factor into the decision making process led to an improvement in mean return from 0.449% to 1.044%. Out of the four pairs that had a statistically significant drift factor, only two showed an improvement, JPY/KWD and CHF/KWD, while the other two pairs, CAD/KWD and SGD/KWD resulted in a reduction in mean return. On an average, the two pairs that showed an improvement in their mean returns had an improvement of 1.67% compared to an average reduction in mean returns of 0.47% for the other two pairs. CHF/KWD had the most improvement of 3.125%, while SGD/KWD had the most reduction of 0.619%. When it comes to volatility only CAD/KWD showed an increase in volatility when the drift factor was introduced, while the other three pairs showed a reduction in volatility. Looking at the Sharpe ratio, it can be seen that considering the drift factor resulted in an improvement from 0.0533 for conventional carry trade to 0.0778 for the drift factor.

Table 4: Comparative Results between Carry Trade and Modified Carry Trade

Pair	Mean Return		Standard Deviation		Sharpe Ratio	
	CT	**Modified**	**CT**	**Modified**	**CT**	**Modified**
SGD/KWD	1.519	0.900	8.458	8.424	0.180	0.107
JPY/KWD	1.602	1.808	14.637	14.635	0.109	0.124
CAD/KWD	0.020	-0.311	13.314	13.422	0.001	-0.023
CHF/KWD	-1.346	1.779	17.577	17.321	-0.077	0.103
Average	0.449	1.044	13.50	13.45	0.0533	0.0778

Figure 3: Comparison between Mean Returns



Conclusion

The results obtained from this paper shows that using the Kuwaiti dinar (KWD) in carry trade is a profitable strategy even in its simplest forms. On an average, carry trade produced a positive returns which was online with previous studies. The study also examined the effect of embedding forecasting element into the carry trade decision making process on its profitability. The results showed that the returns were enhanced when forecasting element, monetary model, was embedded into the decision making process. The results also showed that conducting carry trade on an individual pairs, despite producing positive returns, produced a Sharpe ratio that is less than that of the stock market. Conducting carry trade as a portfolio led to an improvement in mean return, standard deviation and as a result produced a Sharpe ratio that is double of that of stock market. While carry traders conduct carry trade with the assumption that exchange rates move in a driftless random walk manner, the study showed that considering the statistically significant drift factor led to an improvement in mean return, volatility, and Sharpe ratio.

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