

Empirical Analysis on Emerging Issues of Malaysia Outward FDI from Macroeconomic Perspective

Jerome Swee-Hui Kueh, Chin-Hong Puah and
Shazali Abu Mansor

The evidence of Malaysia outward FDI has become obvious particularly in the 1990s. Despite remain as the preference of FDI destinations, Malaysia also emerged as the fifth largest investor among the developing economies in Asia region (UNCTAD, 2005). In view of that, this study intends to examine the macroeconomic determinants of outward FDI of Malaysia, namely real income, exchange rate, trade openness and interest rate. The Johansen and Juselius cointegration test and the vector error correction model are utilized in this study to analyze the quarterly data from 1991:Q1 to 2005:Q4. We found that outward FDI of Malaysia is positively affected by all the variables under study in long run. However, the interest rate does not Granger cause outward FDI in the short run.

Field: Macroeconomics

1. Introduction

Global outward FDI had undergone a series of wave with a peak record of US\$813.1 billion in 2004 but slightly decline to US\$778.7 billion in 2005 (UNCTAD, 2006). In related to that, developed countries remain the foremost sources of outward FDI amounting US\$ 646.2 billion (83 percent of total outflows) in 2005. Notwithstanding, some developing countries particularly in Asia region emerged as important sources of FDI in the 1990s due to the robustness of economic development such as globalization and trade liberalization. This can be seen where Asia countries accounted approximately 71 percent or US\$83.6 billion of outward FDI out of US\$117.5 billion from developing countries.

Jerome Swee-Hui Kueh, Department of Economics, Faculty of Economics and Business, Universiti Malaysia Sarawak. email: kshjerome@feb.unimas.my

Chin-Hong Puah, Department of Economics, Faculty of Economics and Business, Universiti Malaysia Sarawak. email: chpuah@feb.unimas.my

Professor Dr Shazali Abu Mansor, Department of Economics, Faculty of Economics and Business, Universiti Malaysia Sarawak. email: mshazali@feb.unimas.my

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Malaysia is among the developing countries in East Asia region that participate vigorously in abroad investment activities. Outward FDI of Malaysia initiated to expand thoroughly from 1993 onwards (see Table 1). Nevertheless, the outward FDI was inconsistent with a sudden deterioration in 1998 and 2001 due to the Asian financial crisis and economic recession. Although there were irregularities of Malaysia outward FDI trend, there are few Malaysian companies that had expanded vigorously by investing abroad and thus been included in the Top 100 non-Financial Transnational Corporations in 2004. For instance, the top three companies are PETRONAS which ranked second, YTL Corporation Berhad and MISC Berhad which ranked thirty-second and forty-fifth, respectively (UNCTAD, 2006).

Table 1: Outward FDI of Malaysia, 1990-2005 (USD Millions)

Year	FDI Outflows	Year	FDI Outflows
2005	2,971	1997	2,626
2004	2,061	1996	3,768
2003	1,370	1995	2,488
2002	1,904	1994	2,329
2001	267	1993	1,063
2000	2,026	1992	115
1999	1,422	1991	175
1998	863	1990	129

Source: UNCTAD, various issues.

In view with the contemporary economic developments mainly globalization and regionalism issues, identifying the primary determinants contributed to outward FDI of Malaysia is indeed crucial for sustainable growth. Therefore, this study aims to investigate selected macroeconomic determinants of Malaysia outward FDI, namely real income, openness, exchange rate and interest rate. In addition, Investment Development Path (IDP) concept suggested by Dunning (1979) and adopted by Ramasamy (1996)¹ will be embraced to identify the position of Malaysia in the IDP model particularly pre and post of the Asian financial crisis in 1997.

2. Emerging Issues of Macroeconomics Determinants of Outward FDI

There are a number of relevant theories on the development and motivation of FDI explaining the outward FDI activities. One of the most popular theories is the Ownership, Internalization and Locational (OLI) Eclectic Paradigm (Dunning, 1980, 1993). Firms perform abroad investment due to certain ownership (O) advantages obtained by the firms. Subsequently, these advantages enable the firms to utilize through a process of internalization (I) in countries that offer the essential locational (L) advantages. Meanwhile, International Production Theory (Dunning, 1980 and Fayerweather, 1982) emphasize on the tendency of a firm to initiate foreign production depend on the specific attractions of its home compared with resource implications and advantages of locating in another country.

In term of the macroeconomics perspective, the main determine contributed to the outward FDI can be associated to the income of a country. Higher income

of a country will leave essential implication towards structural changes on the economy of the country. As pointed out by Chenery et al. (1986) and Aykut and Ratha (2004), firms are able to gain competitive advantage in term of economy of scale in the production despite adoption of new technologies. Eventually, firms are able to acquire ownership advantages which become the driving force for establishing foreign production (Lall, 1980; Grubaugh, 1987). Meanwhile, higher degree of openness is linked with greater level of outward FDI. Kogut (1983) stressed that the adoption of export-oriented policy eventually enable firms to acquire knowledge on the foreign market as well as skills in running operations abroad. Ultimately, this will become the force for the firms to shift their strategy from exporting to abroad investment.

On the other hand, Kyrkilis and Pantelidis (2003) noticed that income is the most important determinant of FDI outflows for Germany. In addition, they also discovered that exchange rate is an influential factor in affecting the outward FDI of Brazil and Singapore. Meanwhile, low interest rate in the home country relatively will lead to higher tendency of outward FDI (Prugel, 1987; Lall, 1980; Grubaugh, 1987). Indeed abroad investments require sound financially support and capital abundance in term of low interest rate enable firms to access to capital market. Therefore, firms can obtain necessary funding to finance their abroad investment. In related to that, exchange rate also has significant impacts towards the outward FDI. Although countries with stronger currencies in relative to firms from countries with weak currencies, will discourage exports, however this will lead to higher propensity to perform abroad investment due to appreciation of the currencies (Aliber, 1970; Kohlhagen, 1977; Stevens, 1993).

3. Methodology

The data used in this study include of outward FDI, real income of home country, real effective exchange rate, trade openness and interest rate of the home country. The real income is measured in real Gross Domestic Product (GDP) at 2000 constant price, the openness indicates the ratio of the sum of total export and import to GDP, the real effective exchange rate is defined as how the nominal exchange rate adjusted for price differentials between a country and its trading partners have moved over a period of time, while interest rate refers to 3-month Treasury bill rate. The sample period ranges from 1991:Q1 to 2005:Q4. All the data were obtained from World Investment Report, UNCTAD and International Financial Statistics of International Monetary Fund. All the variables were transformed into natural logarithm form before any estimation is conducted.

In this study, the outward FDI is assumed to be influenced by several determinants as represented by Equation (1):

$$LOFDI = \beta_1 + \beta_2 LRGDP + \beta_3 LREER + \beta_4 LOPEN + \beta_5 LI + e \quad (1)$$

where *LOFDI* denotes logarithm of outward FDI, *LRGDP* denotes logarithm of host country real income measured by real GDP, *LREER* denotes logarithm of real effective exchange rate, *LOPEN* denotes openness of the economy, *LI*

represents interest rate, β_s are coefficients to be estimated and e is an error term.

In order to analyze the long run variation from the equilibrium relationship between outward FDI and the determinants, the vector error-correction model (VECM) which consists of the error-correction term (*ECT*) is applied as in Equation (2).

$$\begin{bmatrix} \Delta LOFDI_t \\ \Delta LR GDP_t \\ \Delta LREER_t \\ \Delta LOPEN_t \\ \Delta LI_t \end{bmatrix} = \Gamma(L) \begin{bmatrix} \Delta LOFDI_{t-1} \\ \Delta LR GDP_{t-1} \\ \Delta LREER_{t-1} \\ \Delta LOPEN_{t-1} \\ \Delta LI_{t-1} \end{bmatrix} + \Pi \begin{bmatrix} \Delta LOFDI_{t-1} \\ \Delta LR GDP_{t-1} \\ \Delta LREER_{t-1} \\ \Delta LOPEN_{t-1} \\ \Delta LI_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{OFDI} \\ \varepsilon_{RGDP} \\ \varepsilon_{REER} \\ \varepsilon_{OPEN} \\ \varepsilon_I \end{bmatrix} \quad (2)$$

where $\Gamma(L)$ denotes a 5x5 polynomial matrix of coefficients to be anticipated. L represents the lag operator and Γ denotes the short run adjustments among the variables across the five equations in the system. Meanwhile, Π denotes the error-correction component in levels, Δ denotes the first difference operator and ε 's represents the white noise error terms. Initially, time series properties of the variables will be tested using Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979; 1981) and Phillips-Perron (Phillips and Perron, 1988) unit root tests. Standard VAR will be adopted for estimation if the variables are nonstationary and not cointegrated. On the other hand, VECM will be adopted if the variables are nonstationary and outward FDI is cointegrated with the determinants and an error-correction can be used to represents the residuals from the cointegration equation in Equation (3):

$$\begin{aligned} \Delta LOFDI_t = & \beta_0 + \beta_1 \sum_{k=1}^a \Delta LOFDI_{t-k} + \sum_{k=1}^a \beta_2 \Delta LR GDP_{t-k} + \sum_{k=1}^a \beta_3 \Delta LREER_{t-k} \\ & + \sum_{k=1}^a \beta_4 \Delta LOPEN_{t-k} + \sum_{k=1}^a \beta_5 \Delta LI_{t-k} + \alpha ECT_{t-1} + e_t \end{aligned} \quad (3)$$

The coefficient (α) on the *ECT* denotes the responsiveness of the outward FDI to a move from equilibrium. The statistically significance of *t*-test for lagged *ECT* and the *F*-tests applied to the joint significance of the sum of the lags of each respective independent variable in the system are two important approaches in identifying the causality linkage (see Granger, 1988). The long run and short run causal linkages is represented by the *t*-test of the lagged *ECT* and the *F*-tests of the independent variables in their first differences, respectively.

4. Discussion of Findings

The ADF unit root test result is presented in Table 2. Estimation result shows that the null hypothesis of a unit root cannot be rejected at level form, however, it can be rejected after first differencing, indicating all the variables are $I(1)$. Therefore, we proceed with the cointegration test in the next step to examine the existence of a long run relationship among stationary variables

that are integrated with same order. Table 3 depicts the Johansen-Juselius multivariate cointegration maximum likelihood test result. The null hypothesis of non-cointegration ($r=0$) is rejected by the maximum eigenvalue (λ_{\max}) statistics at 1% significant level. Nevertheless, the null hypothesis of at most one cointegrating vector cannot be rejected, implying the existence of a single cointegrating vector in the model and ultimately there is a stable long run linear equilibrium linkage among the variables under study.

Table 2: Augmented Dickey-Fuller and Phillips-Perron Unit Root Tests Results

Variable	Augmented Dickey-Fuller		Phillips-Perron	
	Level	First Difference	Level	First Difference
LOFDI	-3.049(1)	-5.358(1)***	-2.308	-4.733***
LGDP	-2.041(5)	-4.279(4)***	-2.839	-9.438***
LREER	-2.857(1)	-5.359(0)***	-2.514	-5.251***
LOPEN	-1.869(0)	-6.806(0)***	-2.126	-6.795***
LI	-2.152(0)	-7.172(0)***	-2.504	-7.235***

Notes: LOFDI = natural log of outward FDI, LGDP = natural log of nominal GDP, LREER = natural log of real effective exchange rate, LOPEN = natural log of openness of the economy and LI = natural log of 3-month Treasury bill rate. Asterisks (***) indicate significant at 1% level.

Table 3: Johansen and Juselius Cointegration Test Results

H_0	H_1	λ_{\max}	CV (max, 5%)
Variables: LOFDI, LRGDP, LREER, LOPEN, LI			
$r = 0$	$r = 1$	77.153***	33.460
$r \leq 1$	$r = 2$	24.532	27.070
$r \leq 2$	$r = 3$	13.933	20.970
$r \leq 3$	$r = 4$	10.487	14.07
$r \leq 4$	$r = 5$	0.782	3.76

Notes: r is the number of cointegrating vector. Asterisks (***) indicate significant at the 1% level. Lag selection is based on Final Prediction Error criterion.

Table 4 reports the normalized cointegrating vector and the likelihood ratio exclusion test results. The coefficient estimates of the cointegrating vector are provided by $\beta' = (-1.00, 3.294, 9.701, 7.259, 0.685)$ which are statistically significant at 1% level. These values indicate long run elasticity of the variables. The outcomes show that outward FDI is elastic with respect to three explanatory variables and it is positively related to income, real effective exchange rate and openness of the country. Nevertheless, outwards FDI is inelastic with respect to interest rate.

Table 4: Johansen Cointegration Equation Parameter Estimates and Likelihood Ratio Restriction Tests

	Parameter Estimates	Test for Exclusion	
	Normalized	H ₀	LR(1)
Constant	67.462		
LOFDI	1.000	β_1	47.976***
LRGDP	3.294	β_2	22.816***
LREER	9.701	β_3	28.378***
LOPEN	7.259	β_4	35.382***
LI	0.685	β_5	13.403***

Note: Asterisks (***) indicate significant at the 1% level.

Next, the relations among the variables in the system are investigated via error-correction model. Table 5 tabulates the estimation of error-correction model for outward FDI. This model is satisfactory as proven by the diagnostic tests. The estimated residuals have normal distribution pattern, homoskedasticity variances, serially uncorrelated and well specified. Furthermore, the recursive estimates of CUSUM and CUSUM of squares tests (Figures 1 and 2) indicate that the model is relatively stable as the cumulative sums are fall inside two-standard deviation band. The estimated coefficient of the *ECT* is statistically significant with a negative sign. This means that outward FDI may deviate from its long run equilibrium temporarily, however, the deviation are adjusting towards equilibrium level in the long run. Our result shows that outward FDI needs about slightly more than two quarters to adjust to the long run equilibrium due to the short run disturbances.

Table 6 indicates the results of short run causality test from error-correction model by applying the *F*-test of overall significance in the Wald test context in order to examine the joint significance of the sum of the lags of each independent variable in first difference form. The condition where null hypothesis of no causal effect cannot be rejected implies that the variable does not Granger cause outward FDI in the short run. Empirical results depict existence of short run causal linkage from income, real effective exchange rate and openness of the country to outward FDI excluding interest rate.

Table 5: Estimation of ECM for Outward FDI

Variables	Coefficients	Std. Errors	t-statistics	p-values
Constant	-0.237	0.123	-1.923	0.066
ECT _{t-1}	-0.614	0.161	-3.796	0.000
ΔLOFDI _{t-1}	0.691	0.141	4.889	0.000
ΔLOFDI _{t-2}	0.036	0.157	0.234	0.816
ΔLOFDI _{t-3}	0.336	0.122	2.749	0.011
ΔLOFDI _{t-4}	-0.119	0.107	-1.117	0.275
ΔLOFDI _{t-5}	0.332	0.106	3.113	0.004
ΔLGDP _t	8.759	2.731	3.206	0.003
ΔLGDP _{t-1}	-0.656	2.072	-0.316	0.754
ΔLGDP _{t-2}	3.889	1.859	2.092	0.047
ΔLGDP _{t-3}	2.701	1.847	1.462	0.157
ΔLGDP _{t-4}	-5.753	2.020	-2.847	0.009
ΔLGDP _{t-5}	1.614	1.954	0.825	0.417
ΔLREER _t	5.256	1.842	2.853	0.009
ΔLREER _{t-1}	-2.706	2.262	-1.196	0.243
ΔLREER _{t-2}	-1.879	2.088	-0.899	0.377
ΔLREER _{t-3}	-1.150	2.137	-0.538	0.595
ΔLREER _{t-4}	-7.599	2.283	-3.327	0.002
ΔLREER _{t-5}	1.799	2.313	0.777	0.444
ΔLOPEN _t	7.561	2.453	3.081	0.005
ΔLOPEN _{t-1}	2.329	1.727	1.348	0.190
ΔLOPEN _{t-2}	-2.092	1.540	-1.358	0.187
ΔLOPEN _{t-3}	-0.387	1.593	-0.243	0.810
ΔLOPEN _{t-4}	0.670	1.653	0.405	0.688
ΔLOPEN _{t-5}	4.795	2.007	2.389	0.025
ΔLI _t	0.247	0.487	0.508	0.616
ΔLI _{t-1}	0.354	0.446	0.793	0.435
ΔLI _{t-2}	-0.365	0.413	-0.884	0.385
ΔLI _{t-3}	-0.414	0.438	-0.944	0.354
ΔLI _{t-4}	0.4538	0.439	1.033	0.312
ΔLI _{t-5}	1.1014	0.515	2.137	0.043

Diagnostic Tests:

JB	3.369[0.185]
AR[6]	1.522[0.230]
ARCH[1]	1.476[0.211]
HETERO	0.003[0.958]
RESET[1]	0.009[0.923]

Notes: JB is the Jarque-Bera statistic for residuals normality test. AR and ARCH are the Lagrange Multiplier tests of serial correlation and ARCH effects, respectively. HETERO and RESET refer to White Heteroscedasticity test and Ramsey RESET specification test.

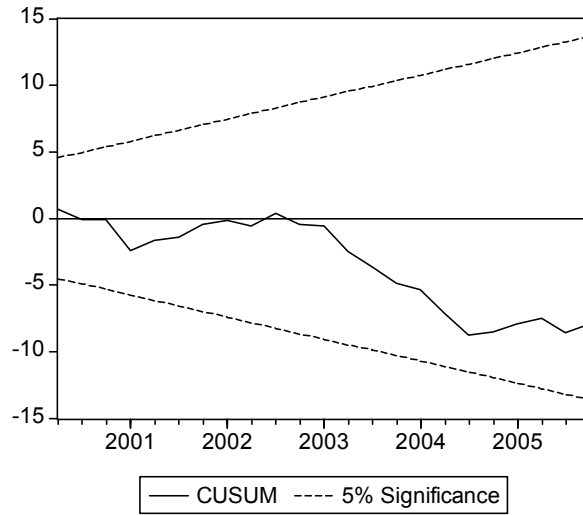


Figure 1: CUSUM Stability Test for Outward FDI ECM

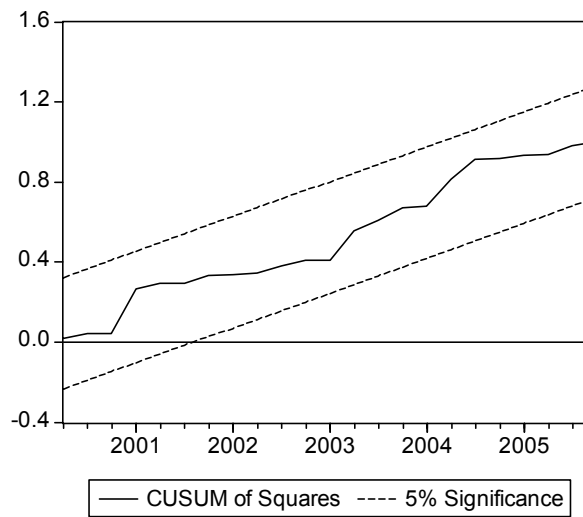


Figure 2: CUSUM of Squares Stability Test for Outward FDI ECM

Table 6: Short-run Granger Causality Test Results

Null Hypothesis	F-statistic of Wald Test [<i>p</i> -value]
	$\Delta LOFDI_t$
$\sum_{i=1}^5 \Delta LOFDI_{t-i}$	6.459 [0.001]***
$\sum_{i=0}^5 \Delta LGDP_{t-i}$	2.559 [0.048]**
$\sum_{i=0}^5 \Delta LREER_{t-i}$	2.827 [0.033]**
$\sum_{i=0}^5 \Delta LOPEN_{t-i}$	2.778 [0.035]**
$\sum_{i=0}^5 \Delta LI_{t-i}$	0.986 [0.458]

Notes: Asterisks (*) and (**) indicate significant at 10% and 5% levels, respectively.

Empirical findings indicate that income, exchange rate, openness and interest rate play critical role in determining the outward FDI of Malaysia. These variables have the similar significance positive relationship with outward FDI in the long run as proven by Kyrkilis and Pantelidis (2003) except for interest rate. The positive long run relationship between outward FDI and income is elastic viewing that varies in the level of income will have enormous impact on the outward FDI of Malaysia. The blend of ownership (O), location (L), internalization (I) advantages gained by Malaysia firms eventually leave significant implications towards the economic development route² of the country. Adoption of export-oriented strategy had transformed the economic structure of Malaysia rapidly from agriculture-based economy towards manufacturing-based economy since 1980s. The shift of the economic policy subsequently enables the country to generate economic growth. Furthermore, the favorable economic performance prior to 1997 and sustainable economic growth commencing 2001 due to adoption of appropriate policies had contributed to consistent growth of Malaysia. Therefore, Malaysia firms are able to utilize their income and enhance the propensity of the firms to participate dynamically in abroad investments.

This study also found out the existence of significance positive long run relationship between exchange rate and outward FDI. This is align with the study by Aliber (1970), Kohlhagen (1977) and Stevens (1993) where firms from countries that have strong currencies are able to support their foreign investments better in financial aspect in relative to the firms from countries with weak currencies. The Ringgit Malaysia had experienced appreciation prior to the financial crisis which recorded RM2.70/USD in 1993 and appreciated to RM2.52/USD in 1996. Besides, the outward FDI of Malaysia also increased more than 80% from USD2,063 millions in 1993 to USD3,768 millions in 1996 (UNCTAD, 2005). This is due to the appreciation of the currency subsequently lowers the capital requirements of foreign investments and enabling the Malaysian firms to gain capital easier. On the other hand, as the Ringgit Malaysia suffered steep depreciation from RM2.60/USD in July 1997 to RM4.70/USD in January 1998, the pegging of Ringgit Malaysia against US dollar at RM3.80/USD on 1 September 1998 in fact indicates appreciation of Ringgit Malaysia relatively. Floating the Ringgit Malaysia indicated further depreciation of the currency but pegging at RM3.80/USD indisputably strengthened the currency during that time. Therefore, this condition enable the firms to expand abroad due to relatively stronger currency as most of the transactions were conducted based on US dollar instead of Ringgit Malaysia.

Meanwhile, the openness of the country also has positive relationship towards the outward FDI due to the economic policy adopted by Malaysia particularly export-oriented approach since 1980. The expansion of Malaysia export activities incorporate with robustness of trade liberalization momentum in 1990s enables firms to obtain information regarding foreign market and knowledge as well as skills in establishing operations abroad³. Ultimately, firms will have the propensity to shift the mode from exporting to FDI as they are gained sufficient knowledge on the foreign market. On the other hand, interest rate depicts contradict result with the findings by Prugel (1981), Lall

(1980) and Grubaugh (1987) where low interest rate in the home country relatively suppose will encourage abroad investments. Although positive linkages exist between interest rate and outward FDI, however, the magnitude of changes due to the exogenous variable is inelastic for the case of Malaysia. This may attributable to the possibility of Malaysia firms in seeking for alternative access to capital market when interest rate increases. This eventually will minimize the opportunity cost as external cost of borrowing become cheaper in relative. Therefore, Malaysia firms are able to expand their abroad investments without much financial impediments.

5. Conclusion

This study examines the association between outward FDI of Malaysia and the macroeconomic determinants, which consist of income, exchange rate, openness and interest rate. The normalized cointegrating vector indicates that outward FDI of Malaysia is elastic with respect to income, exchange rate and openness but inelastic with interest rate. Higher income, stronger currency and robust liberalization of the economy enable Malaysian firms in gaining advantages in term of capital as well as technology and ultimately stimulate the abroad investments. Therefore, efforts in attracting greater volume of FDI into Malaysia as well as encouraging outward FDI are crucial. Based on the IDP framework, Malaysia is going towards the later parts of stage 3 and on the path of shifting towards stage 4. This circumstance provides an overview that Malaysia on the right path of economic development.

In order to accelerate the momentum towards the ideal stage in IDP, Malaysia should seize the opportunities upon the emergence of fast growing economies alike China and India. This is essential as Malaysia can obtain competitive advantages in terms of low production cost by shifting production to China or India for instance. This is due to that fact that outward FDI expansion will generate to the economic growth and consequently benefits the Malaysian in terms of standard of livings, human capital and technologies. Nevertheless, abroad investment should take into consideration on both external and internal factors as to ensure sustainable economic growth.

Endnotes:

1. IDP consists of five degree of FDI expansion – Level 1: Almost non-existence of outward FDI; Level 2: Low pace of inward and outward FDI growth rate; Level 3: Gradual expansion of inward and outward FDI; Level 4: Expansion of outward FDI surpasses inward FDI; Level 5: Expansion of outward and inward FDI resume.
2. See for example, Dunning (1993) and Dunning and Narula (1996).
3. See for example, Kogut (1983).

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