

EXCHANGE-TRADED FUNDS INVESTING IN THE EUROPEAN EMERGING MARKETS

Jitka Hilliard

Auburn University, AL, USA

Thanh Dat Le

Auburn University, AL, USA

ABSTRACT

We examine ETFs investing in the equity of emerging European countries. Our sample contains 364 ETFs in developed Europe and 11 emerging European ETFs from 2005 to 2019. Compared to developed Europe's ETFs, the emerging European equity ETFs are significantly smaller and younger with significantly higher fees. The low correlation of their returns with developed countries and lack of flow sensitivity to the US market volatility suggests that they may be underutilized means of international diversification by investors from developed countries.

Keywords: Exchange-Traded Funds (ETF), Emerging European markets, Tracking error, Fund flows, Diversification

DOI: <http://dx.doi.org/10.15549/jeecar.v9i2.804>

INTRODUCTION

Exchange-traded funds (ETFs) registered tremendous growth in the last decade. The key drivers of their success are cheap diversification, transparency, intra-day liquidity, and easy access to international markets. In 2020, the ETFs assets under management worldwide totaled approximately 7.74 trillion U.S. dollars (Worldwide ETF assets). Many ETFs concentrate on the equity of emerging economies, making these markets accessible to investors from developed countries. According to the U.S. Portfolio Holdings of Foreign Securities report by the Department of the Treasury, Federal Reserve Bank of New York, U.S. investors held 922 billion U.S. dollars of common stock in emerging markets in 2019. Although these holdings are increasing every year, they still represent only 4 percent of emerging market equity.

Many arguments have been made for the benefits of international portfolio diversification

(Grubel, 1968, Bailey and Stulz, 1990, Divecha et al., 1992, DeFusco et al., 1996, Gilmore and McManus, 2002). Investors in developed countries may reduce their portfolio risk, especially by diversification into emerging markets because of their moderate correlations and absence of long-term co-movements with equity returns in developed markets. At the same time, investors may be reluctant to invest in these economies because of the risks associated with the instability of their markets. Many emerging economies, especially those in Latin America and Asia, tend to experience political instability, currency risks, and other macroeconomic issues. In contrast, other emerging economies such as those in Central and Eastern Europe tend to be more politically and economically stable. These post-communist countries have undergone extensive liberalization after the fall of the Soviet Union and have created functioning public equity markets.

In this paper, we examine ETFs investing in emerging European equity. Our objective is to provide a description of these funds and investigate what factors affect flows into them. We find that ETFs investing in emerging European equity are significantly smaller and younger than funds investing in developed Europe. They tend to have a significantly smaller number of holdings and significantly higher fees. In contrast to developed Europe, ETFs investing in emerging European equity predominantly use swap-based synthetic replication techniques. In fact, more than 60 percent of the Emerging European ETFs use synthetic replication compared to only 15 percent of funds investing in developed European equity.

Our paper is related to several streams of literature. First, we contribute to the extensive literature on international diversification. While developed markets are becoming more co-integrated, cointegration between developed and emerging markets is generally lower, providing an opportunity for larger risk-reduction through diversification (Campbell and Hamao, 1992, Arshanapalli and Doukas, 1993, Tsetsekos, 1997, Kanas, 1998, and Bracker and Koch, 1999). During the 1990s, the economies of Central and Eastern European countries underwent economic liberalization characterized by marketization, privatization, and integration into the global markets (Gal and Schmidt, 2017). In 2004 and 2007, several Central and Eastern European nations - the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, Bulgaria, and Romania - became members of the E.U. Participation in the E.U. helps increase these regions' attraction for foreign investment and also equity market participation. Kalotay (2010) documented essential changes to the Central and Eastern European economies thanks to foreign investments after becoming E.U. member states. In addition, the emerging European stock markets also benefit from the increasing demand from E.U. and U.S. investors who seek international investment opportunities. Prats and Sandoval (2020) documented that stock market development after E.U. accession contributes to the economic growth in Central and Eastern European nations.

However, becoming E.U. member states and integrating into the international markets can make the emerging European markets more vulnerable to developed market conditions, harming the benefits from diversification. Using

daily stock market data, Syriopoulos (2006), Aslanidis, and Savva (2011) documented increasing stock market integration between Central and Eastern Europe and the developed euro area. Syllignakis and Kouretas (2011) found a significant increase in dynamic correlation between the U.S. and German stock markets and Central and Eastern European stock markets, especially during the 2007-2009 crisis. More recently, Horvath and Petrovski (2013) and Gjika and Horvath (2013) confirmed the increasing co-movements between Central European and Western European stock markets.

On the other hand, the previous literature shows that emerging European equity can still offer diversification benefits to developed Europe and U.S. investors. Gilmore et al. (2005) found that investment into three Central European equity markets (the Czech Republic, Hungary, and Poland) provided significant diversification benefits for U.S. and German investors. In the same spirit, Egert and Kocenda (2011) noted a trivial intraday correlation between equity market returns of three developed Europe (France, Germany, and the United Kingdom) and two emerging (the Czech Republic and Poland) European stock markets. However, the author notes that the diversification opportunity may change over time as emerging European countries integrate towards the eurozone. Finally, Avdulaj and Barunik (2013) used the intraday high-frequency price data of the Czech and German stock markets from 2008 to 2013 and concluded that there are still time-varying international diversification benefits. Consistent with the second strand of literature, we find that the correlation between the equities of emerging European and developed countries is smaller than the correlation between equities of other emerging and developed countries. European emerging equity ETFs thus may still serve as a vehicle for investors from developed countries to enter these markets and improve their diversification. However, the correlation between emerging European equity and developed countries is the highest during the 2005-2009 crisis period, similar to the findings of Syllignakis and Kouretas (2011).

Second, our paper relates to the literature on the consequences of ETFs' growth for the financial markets of emerging economies. Converse et al. (2020) showed from a sample of 33,019 mutual funds and 6,431 ETFs that returns in countries where ETFs hold a large share of the equity were significantly more sensitive to global financial

conditions. This finding suggests that ETFs act as a new channel for international capital flows and make emerging markets more vulnerable to global economic cycles. Filippou et al. (2019) found that the demand of U.S. investors for foreign country ETFs was significantly correlated with the VIX, but not with foreign market volatility measures, limiting the benefits from international diversification. We find that ETF flows in Emerging Europe are not significantly affected by changes in developed countries' volatility indexes.

DATA

We use data on ETFs from the Morningstar Direct and Bloomberg databases. We identify ETFs investing in emerging European equity using filters on the Global category (Europe Emerging Markets Equity and Europe Equity Mid/Small Cap) and the investment area (Russia & CIS, Poland, Europe Emerging Mkts, Russia). We exclude Turkey as an investment area. For developed Europe, we use filters on the Global category (Europe Equity Large Cap, Europe Equity Mid/Small Cap, UK Equity Large Cap, and U.K. Equity Mid/Small Cap) and the Investment area (Europe, Euroland, UK, Germany, Switzerland, Italy, France, Spain, Europe ex UK, Austria, Netherlands, Sweden, Europe (North), Belgium, Finland, Portugal, Norway, Greece). Using

the above searching criteria, we obtain 2,064 equity ETFs in developed Europe and 92 ETFs in emerging Europe. However, data on total net assets (TNA) are available only for 748 developed Europe ETFs and 31 emerging Europe ETFs, covering around 30% of the fund universe. We further require that ETFs have complete data for all other variables (TNA, monthly net returns, month-end closing price, month-end NAV, yearly expense ratio, the monthly number of stock holdings, and primary prospectus benchmark monthly returns). We also exclude actively managed ETFs in developed Europe since no actively managed ETFs are investing in emerging European equity. Our final sample consists of 375 equity ETFs: 364 ETFs in developed and 11 emerging European countries. Our research sample covers, on average, 89% and 62% of total net assets of ETFs investing in Developed Europe and Emerging Europe, respectively. Therefore, even though we do not have complete data of all ETFs that invest in the markets of interest, our sample is a good representative sample of the universe of ETFs in developed and emerging Europe.

Table 1 presents the number and total assets of ETFs in our sample that invest in equities of developed and emerging European countries from 2005 to 2019.

Table 1: Number and total net assets of European developed and emerging equity ETFs

Year	Number of ETFs		Total Net Assets (\$ million)	
	Developed Europe	Emerging Europe	Developed Europe	Emerging Europe
2005	53	1	24,980.58	126.25
2006	64	2	51,467.71	605.08
2007	86	2	66,617.12	832.01
2008	112	2	57,395.10	320.85
2009	147	3	85,118.82	692.08
2010	168	6	91,672.37	1,464.20
2011	185	7	90,017.95	1,213.60
2012	197	10	118,222.50	2,281.01
2013	214	10	175,298.17	1,747.07
2014	246	10	160,054.24	1,091.79
2015	280	10	221,551.64	705.48
2016	297	10	177,754.09	1,051.17
2017	314	11	250,418.47	1,550.28
2018	303	11	181,061.68	1,053.83
2019	291	11	212,193.73	1,047.83

Although emerging European equity ETFs experienced enormous growth in their assets under management from 2005 to 2010, this growth disappeared after 2010, fluctuating around \$1,300 million. The total net assets of emerging European equity ETFs are about 200 times smaller than the total net assets of developed European

equity ETFs in our sample. The time period examined is from 8/2005 to 12/2019. Table 1 contrasts the number and assets under management of equity ETFs investing in developed and emerging Europe. Figures 1 and 2 show details for European emerging equity ETFs.

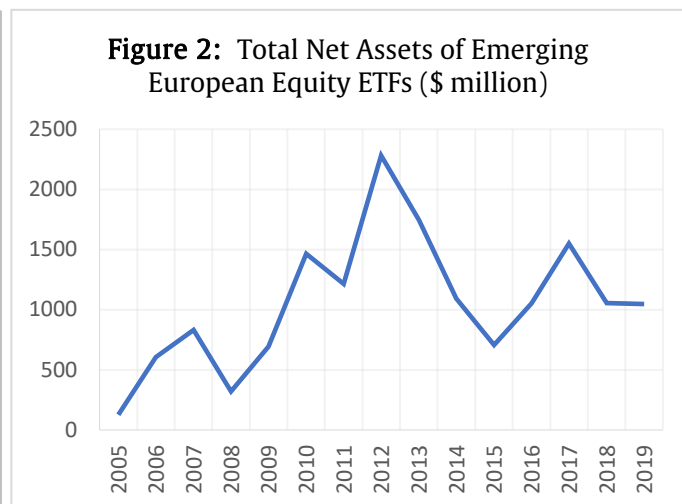
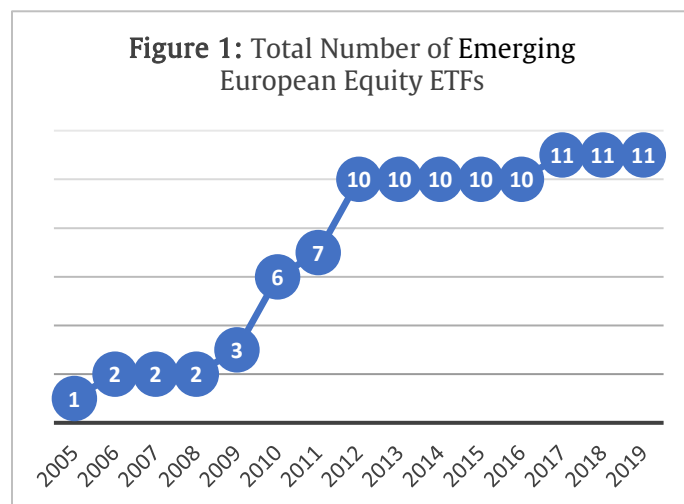


Table 2 provides descriptive statistics for equity ETFs investing in emerging and developed Europe. ETFs investing in emerging European countries are significantly smaller and younger

than their peers in developed Europe. They have significantly higher premiums, higher fees, and tracking errors. They also have a significantly smaller number of holdings.

Table 2: Descriptive statistics

	Emerging Europe	Developed Europe	Difference
Return (%)	0.48	0.55	-0.07
Age (months)	69.93	75.67	-5.74***
Size (\$ million)	159.38	686.86	-527.48***
Price-NAV	1.00	0.99	0.01**
Tracking error (%)	0.62	0.27	0.35***
Expense (%)	0.67	0.33	0.34***
Number of stock holdings	12	117	-105***
Exchanges	6	21	
Number of funds	11	364	

***, **, * denote significance at 0.01, 0.05, and 0.1 levels.

Note: *Tracking error* is based on a 24-month rolling standard deviation of monthly benchmark adjusted returns. *Return* is the Fund's monthly net return, and *Exchanges* is the number of exchanges trading ETFs in the sample.

Table 3 shows what replication techniques ETFs use. Traditional ETFs replicate the underlying index by holding physical securities that constitute the index. The lowest tracking errors are achieved by full replication, i.e., by having all index securities.

This replication method is used primarily by large funds and funds tracking indices with a smaller number of constituents. Partial replication refers to replication that uses only a sample of securities of the underlying index. Although this method results

in higher tracking errors, it decreases costs, especially for smaller funds or funds trading in markets with higher transaction costs.

Table 3: Replication Method used by ETFs

Replication method	Emerging Europe		Developed Europe	
	Sample	All	Sample	All
Physical-Full	3	24	236	1293
Physical-Sample	1	7	65	360
Synthetic Replication	7	61	55	343

Note: The table shows the number of ETFs using each replication method. Columns 1 and 3 display ETFs that are part of our sample; columns 2 and 4 show all European equity ETFs. Some of these ETFs do not have data on all variables and could not be further examined in this paper.

Synthetic replication does not use underlying securities but, instead, derivatives, such as swaps, to track the index. Under this method, the Fund purchases a collateral basket of stocks that partially tracks the underlying index. Then the Fund enters into a swap agreement with a financial institution and exchanges the collateral basket's performance for the performance of the underlying index (Maurer and Williams, 2015). Synthetic replication is unusual for ETFs domiciled in the U.S. because they are organized under the Investment Company Act of 1940 and limited to physical replication. In contrast, the European ETFs are organized as open-end investment companies under UCITS (Undertakings for Collective Investments in Transferable Securities) that allow for the use of derivatives to replicate the underlying index.

Synthetic replication may be cost-effective in the markets with high transaction costs or low liquidity, but it carries a counterparty risk and the

need to renew the swap contracts periodically. Most emerging Europe ETFs use synthetic replication, while developed Europe ETFs mostly mimic the index performance by holding the total number of index constituents. Specifically, 66 percent of emerging European equity ETFs in our sample use synthetic replication compared to only 15 percent of developed Europe ETFs. The full replication is used by only 27 percent of emerging Europe ETFs, but by 66 percent of developed Europe ETFs.

Table 4 shows the pairwise correlations between the equities of developed and emerging countries. We use the FTSE Developed All Cap index for developed markets, the S&P 500 index for the U.S. equity, the FTSE Developed Europe All Cap index for developed European markets, MSCI Emerging Markets index for emerging markets, and the FTSE Emerging Europe index for emerging European countries.

Table 4: Correlations between markets

Panel A. Correlations during 2005-2009 period					
	The U.S.	Developed Europe	Emerging Europe	Developed Markets	Emerging Markets
The U.S.	1.0000				
Developed Europe	0.9172***	1.0000			
Emerging Europe	0.7345***	0.8512***	1.0000		
Developed Markets	0.9683***	0.9817***	0.8275***	1.0000	
Emerging Markets	0.8264***	0.9122***	0.8986***	0.9127***	1.0000

Table 4: Continued.

Panel B. Correlations during 2010-2014 period					
	The U.S.	Developed Europe	Emerging Europe	Developed Markets	Emerging Markets
The U.S.	1.0000				
Developed Europe	0.8716***	1.0000			
Emerging Europe	0.7430***	0.8368***	1.0000		
Developed Markets	0.9652***	0.9578***	0.8369***	1.0000	
Emerging Markets	0.7967***	0.8387***	0.8752***	0.8779***	1.0000
Panel C. Correlations during 2015-2019 period					
	The U.S.	Developed Europe	Emerging Europe	Developed Markets	Emerging Markets
The U.S.	1.0000				
Developed Europe	0.8029***	1.0000			
Emerging Europe	0.5315***	0.6701***	1.0000		
Developed Markets	0.9719***	0.9051***	0.6199***	1.0000	
Emerging Markets	0.6844***	0.7651***	0.7646***	0.7758***	1.0000

***, **, * denote significance at 0.01, 0.05, and 0.1 levels.

Note: This table provides correlations between monthly returns of the U.S. market (S&P 500 index), emerging European markets (FTSE Emerging Europe index), developed European markets (FTSE Developed Europe All Cap index), developed markets (FTSE Developed All Cap index), and emerging markets (MSCI Emerging Markets index).

Not surprisingly, correlations among developed markets are higher than correlations among developed and emerging markets. However, correlations of developed markets with emerging European markets are lower (0.62) than their correlations with other emerging markets, especially since 2015. The lowest correlation is between the U.S. markets and Emerging Europe; in the time period 2015 to 2019, this correlation is only 0.53. This low correlation between equity returns of the U.S. and emerging European markets suggests diversification benefits between these markets. As a result, U.S. investors may benefit more from international Diversification to Emerging European markets than from Diversification to other emerging markets.

TRACKING ERRORS

This section examines whether tracking errors of emerging European equity ETFs are significantly different from tracking errors of developed European ETFs. Tracking errors depict the deviation of fund returns from returns of the

underlying benchmark. Our descriptive statistics document significantly higher tracking errors for emerging European ETFs. Previous literature, however, suggests that tracking errors are related to fund characteristics, such as fund size, age, expense ratio, fund return volatility, and the number of assets in the fund's holdings (Vardharaj, Fabozzi, and Jones, 2004). To address this issue, we create a dummy variable *Emerging* that takes a value of one if the ETF invests in emerging European equity. Then we regress the tracking error on this dummy variable and other fund characteristics:

$$TE_{i,t} = \alpha + \beta_1 Emerging_{i,t} + \beta_2 Log(Age)_{i,t-1} + \beta_3 Log(TNA)_{i,t-1} + \beta_4 Expense_{i,t-1} + \beta_5 Volatility_{i,t-1} + \beta_6 Holdings_{i,t-1} + (TimeFixedEffects) + \epsilon_{i,t}, \quad (1)$$

Where: *T.E.* is a tracking error, *Log(Age)*, *Log(TNA)*, *Expense*, *Volatility*, and *Holdings* are lagged control variables depicting the age, size (as total net assets), volatility of the benchmark

returns, and the number of stocks in Fund's holdings. *Emerging* is a dummy variable denoting the ETF investing in emerging European. *Tracking error* and *fund volatility* are based on a 24-month rolling standard deviation of monthly benchmark adjusted returns and monthly fund returns. *Log(Age)*, *Log (TNA)*, *Expense*, *Volatility*, and *Holdings* are lagged control variables depicting the size, age, volatility of the benchmark returns, and the number of stocks in the Fund's holdings. The regressions include month fixed effects, and standard errors are clustered at the fund level.

The results of the regression are shown in Table 5, columns 1 and 2. The dummy variable *Emerging* is not significantly different from zero, suggesting

that after controlling for Fund's characteristics, tracking errors of European emerging equity ETFs are not significantly different from tracking errors of developed Europe ETFs. Larger and younger ETFs tend to have smaller tracking errors; the number of holdings does not have a significant effect on tracking error.

Because ETFs in emerging Europe tend to use synthetic replication, we create a dummy variable *Synthetic replication* that takes the value of one for funds that use synthetic replication. The coefficient on this dummy variable is negative, suggesting that synthetic replication lowers tracking error, but the effect is not significant (Table 5, column 3).

Table 5: OLS regressions of tracking errors and monthly net returns of developed Europe *versus* emerging Europe equity ETFs

	Tracking error (%)	Tracking error (%)	Tracking error (%)
Emerging	0.1878	0.0207	0.0342
	(0.1653)	(0.2397)	(0.2518)
Synthetic replication			-0.0191
			(0.0709)
Log(Age)_{t-1}	-0.1626***	-0.1949***	-0.1909***
	(0.0381)	(0.0485)	(0.0476)
Log(TNA)_{t-1}	-0.0385***	-0.0330***	-0.0353***
	(0.0116)	(0.0121)	(0.0129)
Expense_{t-1}	0.1026	0.1136	0.1009
	(0.1851)	(0.1879)	(0.1923)
Holdings_{t-1}	-0.0000	-0.0001	
	(0.0001)	(0.0002)	
Volatility_{t-1}	0.0357**	0.1029*	0.1040*
	(0.0164)	(0.0570)	(0.0572)
Constant	0.9615***	0.7223**	0.7223**
	(0.2005)	(0.2987)	(0.2987)
Fixed Effects	No	Yes	Yes
N	25232	25232	25232

***, **, * denote significance at 0.01, 0.05, and 0.1 levels.

DETERMINANTS OF FLOWS

This section examines the determinants of flows to ETFs investing in emerging European equity and their counterparts investing in developed Europe. We are especially interested in whether previous returns attract investors into emerging European

equity. Following previous research that documents the dependence of Fund flows on fund characteristics and previous fund flows (Clifford, Fulkerson, and Jordan, 2014), we estimate the following regression:

$$Flow_{i,t} = \alpha + \beta_j \sum_j FundVariables_{i,t-1} + \beta_k \sum_k ExchangeVariables_{i,t-1} + (TimeFixedEffects) + \epsilon_{i,t}, \quad (2)$$

Where *Flow* is the monthly ETF net flow. *Tracking error* and *fund volatility* are based on a 24-month rolling standard deviation of monthly benchmark adjusted returns, monthly fund returns, and monthly benchmark returns. *Return* is the Fund's monthly net return. All variables are lagged by one month. The regressions include month fixed effects, and standard errors are clustered at the fund level.

The results are presented in Table 6. Flows into the ETFs investing in developed Europe are significantly higher for funds with higher previous returns. Surprisingly, this is not true for ETFs investing in emerging Europe, whose flows are not significantly related to previous returns.

Looking at other variables, in the developed Europe category, ETFs that are smaller, younger, and those with lower fees and higher volatility enjoy significantly higher flows. For emerging European ETFs, the only variables that have a significant effect on flows are size and tracking errors. Within this category, the smaller ETFs and ETFs with lower tracking errors attract higher flows.

Emerging markets ETFs represent a low-cost vehicle for foreign investments to enter local markets. Filippou et al. (2019) showed that the flows into emerging market ETFs depend on economic shocks in developed countries, particularly the U.S. As the U.S. investors react to the domestic economic conditions, they also adjust their foreign investments, including those in emerging markets. Changes in net flows to emerging market ETFs then contribute to the transmission of U.S. shocks into those markets, limiting the diversification benefits of emerging market strategies.

To examine if shocks in developed markets affect flows into ETFs of emerging European countries, we add market volatility in the U.S. (rolling 24-month standard deviation of S&P 500 Index return) and developed Europe (rolling 24-month standard deviation of FTSE Developed Europe All Cap Index return) to our regression. Results are reported in Table 6, columns 5 to 8.

We find that net flows into equity ETFs in developed Europe are negatively affected by market volatility in the U.S. However, surprisingly, market volatilities in the U.S. and developed

Europe do not affect the equity flows into European emerging equity ETFs; the finding is contrary to Filippou et al. (2019) for other emerging markets.

CONCLUSIONS

The emergence of international markets ETFs in the last two decades has significantly improved investors' ability to diversify globally, including diversification into emerging markets. While most earlier studies focus on the emerging markets of Latin American, Asian, and Indonesian countries, markets of emerging European countries remain understudied. In this paper, we investigate ETFs that invest in emerging European equity and examine their tracking errors and factors that affect flows into these ETFs.

We discovered that emerging European equity ETFs are significantly smaller and younger than ETFs of developed Europe. They utilize mainly synthetic replication, probably to avoid low liquidity in these markets. However, after adjusting for fund characteristics, their tracking errors are not significantly different from the tracking errors of their counterparts in developed Europe.

Emerging European equity ETFs may represent diversification benefits for investors from developed countries because the correlation of their returns with equity returns of developed countries is smaller than the correlation of other emerging countries. In addition, the net flows into these funds are not affected by the shocks in developed equity markets. This may be because of the low participation of investors from developed countries in these funds or the lower sensitivity of the underlying emerging European equity to these shocks. Further work should examine in more detail the diversification benefits of emerging European equity, the factors that affect flows into these ETFs, and why these ETFs are not experiencing growth similar to other emerging markets ETFs.

Table 6: Determinants of flow to Developed Europe and Emerging Europe equity ETFs

	Emerging	Developed	Emerging	Developed	Emerging	Developed	Emerging	Developed
Return _{t-1}	0.0559	0.1150**	-0.0162	0.4661**	0.0702	0.1201**	0.0874	0.1177*
	(0.0890)	(0.0574)	(0.0964)	(0.1931)	(0.0867)	(0.0577)	(0.0779)	(0.0626)
Tracking error _{t-1}	-2.4304*	-0.6926	-3.1193*	-0.6261	-2.5788	-0.7365	-2.6544	-0.6502
	(1.3283)	(0.5499)	(1.7009)	(0.5533)	(1.7570)	(0.5601)	(1.5907)	(0.5607)
Price-NAV _{t-1}	-2.2121	38.4316***	-0.6932	31.6373**	-3.2723	38.7174***	0.3150	38.1410***
	(16.4964)	(13.9126)	(24.0132)	(13.3736)	(16.8218)	(13.9285)	(14.8322)	(14.0589)
Log (Age) _{t-1}	-3.8154	-1.4395***	-2.5010	-1.3382**	-2.8400	-1.4821**	-2.8012*	-1.3689**
	(2.2653)	(0.5114)	(1.7860)	(0.5359)	(1.6538)	(0.5724)	(1.4973)	(0.5299)
Log (Size) _{t-1}	-1.3681*	-0.9711***	-1.7159*	-1.0082***	-1.7098	-0.9722***	-1.7388*	-1.0088***
	(0.7008)	(0.3149)	(0.8831)	(0.3212)	(0.9714)	(0.3189)	(0.8920)	(0.3226)
Expense _{t-1}	-4.4536	-2.2553*	-3.7588	-2.8771**	-4.0093	-2.1757*	-3.8023	-2.7988**
	(2.5380)	(1.2968)	(2.6064)	(1.3598)	(2.5189)	(1.3083)	(2.4850)	(1.3584)
Volatility _{t-1}	0.1486	0.2858***	-0.5509	0.6260**	-0.3282	0.6097**	-0.4322	0.6240***
	(0.1926)	(0.1034)	(0.3867)	(0.2443)	(0.3846)	(0.2410)	(0.2946)	(0.2390)
Flow _{t-1}	-0.0462	-0.0184*	-0.0560	-0.0189**	-0.0458	-0.0186*	-0.0517	-0.0199**
	(0.0779)	(0.0096)	(0.0804)	(0.0093)	(0.0775)	(0.0096)	(0.0802)	(0.0097)
US Market Volatility					1.1100	-0.6261**	3.1939	-1.1249
					(0.6895)	(0.2840)	(2.0273)	(1.0835)
Developed Europe Market Volatility					1.8341	-0.1341	7.8909	0.7688
					(1.4820)	(0.4529)	(5.8593)	(1.5109)
Constant	29.0694	-25.6597*	28.5383	-20.9105	26.9992	-25.2137*	16.9644	-23.0981*
	(27.9303)	(13.8063)	(34.8206)	(13.5312)	(27.5749)	(13.8373)	(21.0235)	(13.8664)
Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
N	944	23785	928	23785	944	23785	944	23785

***, **, * denote significance at 0.01, 0.05, and 0.1 levels.

REFERENCES

- Arshanapalli, B., & Doukas, J. (1993). International stock market linkages: Evidence from the pre- and post-October 1987 period. *Journal of Banking & Finance*, 17(1), 193-208.
- Aslanidis, N., & Savva, C. S. (2011). Are there still portfolio diversification benefits in Eastern Europe? Aggregate versus sectoral stock market data. *The Manchester School*, 79(6), 1323-1352.
- Avdulaj, K., & Barunik, J. (2013). Can we still benefit from international Diversification? the case of the Czech and German stock markets. arXiv preprint arXiv:1308.6120.
- Bailey, W., & Stulz, R. M. (1990). Benefits of international Diversification: the case of Pacific Basin stock markets. *The journal of portfolio management*, 16(4), 57-61.
- Bracker, K., & Koch, P. D. (1999). Economic determinants of the correlation structure across international equity markets. *Journal of Economics and Business*, 51(6), 443-471.
- Campbell, J. Y., & Hamao, Y. (1992). Predictable stock returns in the United States and Japan: A study of long-term capital market integration. *The Journal of Finance*, 47(1), 43-69.
- Clifford, C. P., Fulkerson, J. A., & Jordan, B. D. (2014). What drives ETF flows?. *Financial Review*, 49(3), 619-642.
- Converse, N., Levy-Yeyati, E. L., & Williams, T. (2020). How ETFs amplify the global financial cycle in emerging markets. FRB International Finance Discussion Paper, (1268).
- DeFusco, R. A., Geppert, J. M., & Tsetsekos, G. P. (1996). Long-run diversification potential in emerging stock markets. *Financial Review*, 31(2), 343-363.
- Divecha, A. B., Drach, J., & Stefek, D. (1992). Emerging markets: a quantitative perspective. *Journal of Portfolio Management*, 19(1), 41.
- Égert, B., & Kočenda, E. (2011). Time-varying synchronization of European stock markets. *Empirical Economics*, 40(2), 393-407.
- Filippou, I., Gozluclu, A. E., & Rozental, H. (2019). ETF arbitrage and international diversification. WBS Finance Group Research Paper, (260).
- Gal, Z., & Schmidt, A. (2017). Geoeconomics in central and eastern Europe: Implications of FDI.
- Gilmore, C. G., & McManus, G. M. (2002). International portfolio diversification: U.S. and Central European equity markets. *Emerging Markets Review*, 3(1), 69-83.
- Gilmore, C. G., McManus, G. M., & Tezel, A. (2005). Portfolio allocations and the emerging equity markets of Central Europe. *Journal of Multinational Financial Management*, 15(3), 287-300.
- Gjika, D., & Horvath, R. (2013). Stock market comovements in Central Europe: Evidence from the asymmetric DCC model. *Economic Modelling*, 33, 55-64.
- Grubel, H. G. (1968). Internationally diversified portfolios: welfare gains and capital flows. *The American Economic Review*, 58(5), 1299-1314.
- Horvath, R., & Petrovski, D. (2013). International stock market integration: Central and South-eastern Europe compared. *Economic Systems*, 37(1), 81-91.
- Kalotay, K. (2010). Patterns of inward FDI in economies in transition. *Eastern Journal of European Studies*, 1(2), 55-76.
- Kanas, A. (1998). Linkages between the U.S. and European equity markets: further evidence from cointegration tests. *Applied Financial Economics*, 8(6), 607-614.
- Maurer, F., & Williams, S. O. (2015). Physically versus Synthetically Replicated Trackers: Is There a Difference in Terms of Risk?. *Journal of Applied Business Research (JABR)*, 31(1), 131-146.
- Prats, M. A., & Sandoval, B. (2020). Does stock market capitalization cause GDP? A causality study for Central and Eastern European countries. *Economics*, 14(1).
- Syllignakis, M. N., & Kouretas, G. P. (2011). Dynamic correlation analysis of financial contagion: Evidence from the Central and Eastern European markets. *International Review of Economics & Finance*, 20(4), 717-732.
- Syriopoulos, T. (2006). Risk and return implications from investing in emerging European stock markets. *Journal of International Financial Markets, Institutions and Money*, 16(3), 283-299.
- Tsetsekos, G. (1997). Co-integration and the investment horizon in emerging capital markets. M. Papaioannou and G. Tsetsekos, eds. *Emerging Markets Portfolios: Diversification and Hedging Strategies*.

U.S. Portfolio Holdings of Foreign Securities.
October 2020. Department of the Treasury,
Federal Reserve Bank of New York.
https://ticdata.treasury.gov/Publish/shca2019_report.pdf.

Vardharaj, R., Fabozzi, F. J., & Jones, F. J. (2004).
Determinants of tracking error for equity
portfolios. *The Journal of Investing*, 13(2), 37-
47.

Worldwide ETF assets under management 2003-
2020. (18 Feb. 2021). Statista.
www.statista.com/statistics/224579/worldwide-etf-assets-under-management-since-1997/.

ABOUT THE AUTHORS

Jitka Hilliard, email: jzh0023@auburn.edu

Dr. Jitka Hilliard is a professor at Auburn University. She received her Ph.D. in Finance from Louisiana State University. Her research interests include investments and option pricing. She teaches Investments and Security Analysis in the undergraduate program and a Ph.D. seminar in investments.

Mr. Thanh Dat Le is a Ph.D. candidate in the Department of Finance at Auburn University. His research focuses on exchange traded funds (ETFs).