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Investor overreaction and unobservable portfolios: evidence from an emerging market

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We use the system GMM to explore both cross sectional variations and time-series effects within the post-event period for losers and winners portfolios. Some of these effects are not observable, but ignoring them lays the estimation open to bias from concealed heterogeneity amongst companies and periods. Using daily data on a sample of companies which experienced dramatic 1-day price changes, we find strong evidence of price reversal. We also find that unobservable portfolios outperform traditional size portfolios.

Keywords: price reversal; system GMM; unobservable effects

JEL Classification: G14

I. Introduction

The efficient market hypothesis assumes that stock prices reflect all information available instantly, therefore prices follow a random walk. However in reality, investors tend to overreact to new information, such as positive and negative shocks. DeBondt and Thaler (1985) – the first to empirically examine the overreaction hypothesis – argue that stock prices can be predicted using only past return data (3–5 years) in case of systematic price overshoot, which implies violation of the weak-form market efficiency. DeBondt and Thaler (1985) also find that past loser portfolios outperform past winner portfolios by 24.6%. This implies that selling winners short and buying losers is a profitable strategy. They argue that the overreaction phenomenon causes past loser portfolios to be underpriced and past winner portfolios to be overpriced. In addition, they find evidence that the overreaction effect is asymmetric and most of the cumulative average abnormal residuals (16.6%) are realized in January.

The existing literature on the overreaction phenomenon has extensively used time series analysis (DeBondt and Thaler, 1985; Conrad and Kaul, 1993; Da Costa, 1994; Jegadeesh and Titman, 1995; Loughran and Ritter, 1996; Dissanaike, 1997). Another much smaller strand of the literature used cross-sectional analysis (Bremer and Sweeney, 1991; Cox and Peterson, 1994; Larson and Madura, 2003; Ma *et al.*, 2005; Otchere and Chan, 2003). Failure to combine the time-series with the cross-sectional dimension may cause group (company) heterogeneity bias (Hsiao, 2001; Baltagi, 2010). Farag and Cressy (2010) were the first to investigate the overreaction phenomenon using fixed-effects (FEs) model. Yet, although this approach improves on existing literature by taking into account unobserved heterogeneity, it still does not control for the dynamic nature of the model, and the possible endogeneity of the regressors.

In this article, we contribute to the literature along two main dimensions. First, we make use of a new methodology to investigate the overreaction phenomenon, namely,

the system generalized method of moments (GMM) estimator (Blundell and Bond, 1998), which combines both cross-sectional and time-series dimension of the data (CSTS) within a dynamic model, and controls both for unobserved heterogeneity and for the possible endogeneity of the regressors. To the best of our knowledge, this methodology has never been used to test for the overreaction hypothesis. Second, the existing literature only employs observable factors such as size to explain the overreaction phenomenon. To the best of our knowledge, no other study has identified the potential impact of unobservable factors on price reversal. We fill this gap in the literature by constructing the so-called unobservable portfolios based on company-specific FEs (unobservables) and show how these portfolios outperform the traditional size portfolios.

Our analysis is based on data from the Egyptian stock exchange (EGX). EGX has become one of the biggest and most promising emerging markets in Middle East and North Africa region, having grown substantially since the beginning of the Egyptian economic reform and having gone through a privatization programme in the mid-1990s. During the global financial crisis of 2007–2008, the Egyptian economy achieved a remarkable real GDP growth rate of 7.2% in 2007 and 4.2% in 2008, while some leading developed economies languished with negative or zero growth. As a result, Egypt was chosen by the Economic Reform Forum of the World Bank to be among the seven best countries in the world in taking effective steps for economic reform and enhancing the investment climate.[1] Using daily price data on a sample of 100 companies which experienced dramatic 1-day price changes (at least 10%), we show strong evidence of price reversals. In addition, we find that past losers significantly outperform past winners. More importantly, the system GMM suggests that portfolios constructed based on low-company-specific effects outperform those of high-specific effects. This result is new to the literature as we argue that investors may earn higher abnormal returns by forming so-called 'unobservable portfolios' based on company-specific effects. Finally, we find evidence that the political connections of the board members, management quality and corporate governance compliance are the main unobservable factors which may explain the overreaction phenomenon in the EGX.

We believe that understanding market imperfections works as an early warning system to the regulator, especially in emerging stock markets, which are typically more informationally opaque, less efficient and characterized by higher risk than well-established markets. Thus, our article has clear policy implications as it provides clear evidence of such imperfections within the EGX, one of the leading emerging stock markets. The rest of the article is organized as follows. Section II presents a survey of the literature. Section III gives some background about the EGX. Section IV provides a brief description of our data set. Section V presents details of our econometric methodology. Section VI reports our empirical results, and Section VII concludes.

II. Literature Review

In this section, we summarize the main findings of the literature on short-term overreaction in both developed and emerging markets. Atkins and Dyl (1990) investigate the short-term overreaction in the US. They define the event as stock prices that experienced a large price change in a single trading day.[2] They find strong evidence of short-term overreaction in case of bad news and weak evidence in case of good news. Following Brown and Warner (1980), Liang and Mullineaux (1994) find significant price reversal post negative and positive shocks. They also find that stock prices tend to decrease prior to positive shocks and increase prior to negative shocks. Focusing on Fortune 500, Bremer and Sweeney (1991) find that positive cumulative excess returns (2.2%) tend to follow large negative price drops over the next 2 days. They also find that price reversal is unrelated to weekend and turn-of-the-year effects. Cox and Peterson (1994) investigate the role of the bid-ask spread and stock liquidity in explaining stock price reversal following a large 1-day return drop (at least 10%) in NYSE, AMEX and NMS. They find strong evidence of post-event price reversals, but the degree of reversal diminishes over time. They also find evidence of a small-firm effect and argue that the price reversal phenomenon can be attributed to the bid-ask spread. By contrast, Park (1995) finds that bid-ask spreads do not fully explain price reversals in NASDAQ/NMS following 1-day large price drop. Bowman and Iverson (1998) find that the overreaction phenomenon is not attributed to bid ask bounce, nonsynchronous trading or size effect in the New Zealand stock market.

Recently, Lobe and Rieks (2011) tested the short-term overreaction hypothesis in the main German stock market indices. They define the event following Bremer and Sweeney (1991) and Cox and Peterson (1994). They find significant evidence of short-term overreaction, which is

[1] For more details, see the World Federation of Exchanges (WFE) statistics in 2009 and 2010. Some institutional factors distinguish the Egyptian stock market from other emerging markets such as the fact that neither capital gain nor dividends are taxed.

[2] A large strand of literature defines the event as when stocks experience at least a 10% price drop in a single trading day (see, e.g. Atkins and Dyl, 1990; Bremer and Sweeney, 1991; Cox and Peterson, 1994; Liang and Mullineaux, 1994; Larson and Madura, 2003; Ma *et al.*, 2005; Farag and Cressy, 2010; Lobe and Rieks, 2011).

not due to firm size or bid-ask spreads. Zarowin (1989) finds that loser portfolios significantly outperformed winner portfolios (by 2–2.5% per month) in the NYSE regardless of size. Larson and Madura (2003) find evidence of the overreaction phenomenon, and their results support the overconfidence and self-attribution bias[3] by Daniel *et al.* (1998).

Otchere and Chan (2003) find little but significant evidence of price overreaction in the Hong Kong stock exchange (HKSE) before the Asian financial crises. They also find that the overreaction phenomenon diminishes during the crisis period and cannot be explained by either bid-ask spreads or the day of the week effect. Similarly, Ma *et al.* (2005) find little evidence of price overreaction in the NYSE for both winner and loser portfolios. However, they find significant price reversal and evidence of the overreaction phenomenon in the NASDAQ. Few studies have investigated the short-term overreaction hypothesis in emerging markets (e.g. Antoniou *et al.*, 2005). Farag and Cressy (2010) investigate the disposition effect (defined as selling winner portfolios and buying loser portfolios) in the EGX for companies which experience 1-day dramatic price changes. Using a static panel data model, they find that the FE model best suits the EGX data and that unobservable factors play an important role in explaining the overreaction phenomenon. Their results support the disposition effect as past loser portfolios outperform past winner portfolios.

The above discussion shows that there are two main strands in the literature to explore the short-term overreaction hypothesis, namely, studies that make use of the time-series dimension only (DeBondt and Thaler, 1985; Atkins and Dyl, 1990; Bowman and Iverson, 1998) and studies that focus on the cross-sectional dimension (Cox and Peterson, 1994; Larson and Madura, 2003; Lo and Coggins, 2006). We believe that combining these two dimensions allows us to control for company-specific effects and to deal effectively with heterogeneity bias. Based on the above discussion, we believe that the overreaction hypothesis can be better identified and understood using a dynamic panel data approach, which controls both for unobserved heterogeneity and for the possible endogeneity of the regressors, while also taking into account the dynamic nature of the model.

III. Background on the EGX

The Egyptian stock market was classified by the *Economist* in 2010 as one of the best six emerging markets (CIVETS) offering significant potential growth over the next decade.[4] In addition, the World Federation of Exchanges' (WFE) statistics in 2010 report that the Egyptian exchange achieved average gains of 15% during 2010, ahead of many leading world emerging stock exchanges such as China, Brazil and the Czech Republic, and ahead of all Arab stock markets except for Qatar (25%) and Casablanca (21%). The Standard and Poor's S&P IFCI reports that the average growth rate for the EGX during 2010 was 13% in US$. By comparison, the average growth rate for other emerging markets was 12%.

The Egyptian stock market achieved reasonable performance indicators during 2008–2010, even though the negative impact of the global financial crisis affected the vast majority of stock markets throughout the world. The main market indicators diminished only slightly in 2010 compared with 2009. The total value traded during 2010 was LE 321 billion compared with LE 448 billion in 2009. At the same time, the total trading volume was 33 billion securities in 2010 compared with 37 billion securities in 2009. The market capitalization of the main market was LE 488 billion (40% of the GDP) in 2010 compared with LE 500 billion in 2009. In 2010, the EGX achieved an attractive P/E of 14.7 compared with 13 in 2009. Based on the statistics of the S&P/IFC, the average P/E for emerging markets was 13.5. Furthermore, the dividend yield increased from 6.5% in 2009 to 7.1% in 2010. Foreign investments accounted for 22% of the total trading volume in 2010, and total foreign capital inflows rose to LE 8.4 billion in 2010, compared with LE 5 billion in 2009. In 2010, foreign investments in the EGX were dominated by Europe (43%), the US (27%) and Arab investments (24%). UK investors accounted for 37% of the total foreign investments. The Egyptian stock market is attractive for international investors as neither capital gains nor dividends are taxed. The above discussion shows that EGX has become one of the biggest and most promising emerging markets in Middle East and North Africa region. Studying the EGX may add to the existing overreaction literature and provides clear evidence of stock market imperfection; therefore, investors can earn abnormal return by exploiting the overreaction anomaly.

IV. Data

To examine the short-term overreaction hypothesis in the Egyptian stock market, daily data of stock prices, free float market capitalization and EGX 30 market index are collected for 100 listed shares in the EGX over the period 2003 to 2010. Our sample includes all listed shares traded with no strict price limits (±5%).[5] We define winner (loser)

[3] This bias occurs when people attribute successful outcomes to their skills, but attributing their failure to external factors.
[4] Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa.
[5] The total number of listed shares in the EGX was 202 shares in 2010.

portfolios as the sets of firms experiencing a 1-day price rise (fall) of at least 10% (i.e. the event). Following Bremer and Sweeney (1991) and Cox and Peterson (1994), each event should satisfy the following conditions: nonoverlapping, non-Monday, non-January events, to avoid seasonality bias. Moreover, we restrict the market price of all shares included in our sample to at least 10 Egyptian pounds to avoid the bid-ask spread bias following Cox and Peterson (1994).

We use the EGX 30 index, a free-floated market capitalization weighted index to represent the Egyptian stock market benchmark. Following Cox and Peterson (1994) and Farag and Cressy (2010), the estimation period for betas is (−105, −6) and the test period is (+1, +120) days. We use the CAPM as a benchmark to measure the abnormal returns with betas estimated for each security over the 100 days prior to the event. Other measures are also tried, namely, the market model and market adjusted abnormal return, but qualitatively the results remain the same. This is in line with the literature (Cox and Peterson, 1994). Stocks' abnormal returns in the test period are defined as the residuals of the CAPM model.

V. Econometric Methodology

The system GMM

Farag and Cressy (2010) are the first to empirically investigate the overreaction phenomenon using a FEs model. However, many econometrics problems may arise when using static panel data models.[6] To overcome these conceptual and statistical drawbacks, Blundell and Bond (1998) introduce the system GMM estimator,[7] which combines in a system the equation in first differences with the same equation expressed in levels. Motivated by the literature of short-term overreaction and in particular Cox and Peterson (1994) and Larson and Madura (2003), we incorporate the initial abnormal returns in event day AR_{i0} into our model to examine the price reversal phenomenon. We expect that large stock price movements will be followed by price reversals in the opposite direction (the directional effect of Brown and Harlow, 1988). We control for the effect of the leakage of information on the cumulative abnormal return and use the cumulative average abnormal returns (CARs) for 3 days before the event date as a proxy for the leakage of information following Larson and Madura (2003). We expect that the greater the leakage of information the greater the post-cumulative abnormal returns as this may imply higher degree of market imperfection in emerging markets. We also control for firm size to examine the small firm effect, according to which small firms have greater reversals compared with large firms (Cox and Peterson, 1994). We also estimate the FEs model of Equation 1 and used its residuals as a proxy for the unobservable company-specific effects. Then, we create the dummy variable 'DumQ' as a proxy for the unobservable company-specific effects. This dummy variable takes the value of 1 if the FEs are positive within estimation window and 0 otherwise. Finally, we control for the style of ownership by including the dummy variable 'private' into our model to examine the effect of the ownership on the overreaction phenomenon:

$$CAR_{it} = \beta_1 CAR_{it-1} + \beta' x_{it} + \varepsilon_{it}, \quad i = 1, ...100; \quad t = 1, ..10,\ 1...20 \text{ and } 1, ...120 \qquad (1)$$
$$\varepsilon_{it} = \mu_i + v_{it}$$

where $\beta' = (\beta_1, \beta_2, \beta_3, \beta_4, \beta_5)$ and $x_{it}' = (AR_{i0}, \text{Lnmcap}_{it}, \text{Leak}_{it}, \text{Private}_i, \text{DumQ}_i)$

where

CAR_{it} is the cumulative average abnormal returns over 10, 20, 50 and 120 days post-event;
AR_{i0} is the initial abnormal return in event day (i.e. at t = 0);
$\ln mcap_i$ is the natural logarithm of the free-floated market capitalization of company i;
Leak_i represents the CARs for 3 days before the event date and serves as a proxy for the leakage of information;
DumQ is a dummy variable, takes the value of 1 if the company FE is positive within the estimation window and 0 otherwise;
$private_i$ is a dummy variable = 1 if the company was privately held before IPO, and 0 otherwise.

Lagged levels are used as instruments for the regression in differences, and lags of the first-differenced variables for the equation in levels. Following the literature, we use three lags of suspect endogenous variables as instruments in the equation in first-differences, and two lags of their difference as instruments in the equation in level.

We report the AR (1) and AR (2) tests for the first- and second-order serial correlation of the differenced residuals, whereby the null hypothesis is that of no

[6] First, regressors may be endogenous and correlated with the residuals. Second, the FE model assumes that errors are correlated with company FEs. Third, due to the assumptions of these models, in order to get estimates of the FEs, one cannot include time-invariant variables. Finally, serial correlation and heteroscedasticity may bias the estimation.
[7] The system GMM estimator allows for fixed individual effects and endogenous regressors. It also assumes that the idiosyncratic error terms are heteroscedastic and serially correlated, and uncorrelated across companies (Roodman, 2009).

serial correlation. We are particularly interested in the AR (2) test as the test of AR (1) usually rejects the null hypothesis in a first-differenced model (Roodman, 2009). We also report the Hansen test of the overidentifying restrictions. The null hypothesis associated with the Hansen test is that the instruments are exogenous. Insignificant value of both test indicates that the instruments are adequate and that the model is correctly specified.

Unobservable or size portfolios?

The existing body of the literature has extensively used company size as a basis of portfolio formation. In this section, we introduce an alternative portfolio formation, namely, the unobservable portfolios (company-specific effects portfolios), then we examine their performance compared with the traditional size portfolios. Company-specific factors may include nonquantifiable factors such as management quality and political connections. We argue that these factors may have an impact on investor overreaction. Unobservable portfolios are formed on the basis of FEs estimated on the estimation window of Equation 1. If the FEs are important predictors of post-event returns, such portfolios should outperform those constructed according to size criteria. To further develop the analysis, we therefore test the hypothesis that unobservable portfolios outperform size portfolios. Therefore, we form two main portfolios, namely, size and unobservable portfolios.

Companies are ranked in an ascending order based on their market capitalization within the estimation window. We use both market capitalization and free-float market capitalization as a proxy of size. To form the unobservable portfolios, we extract the FEs (companies' specific effects) within the estimation window, and then sort the companies' FEs into an ascending order. All sample firms are grouped into five quintiles based on company FEs and market capitalization. We then estimate the CARs for two size portfolios, namely, big and small, as well as for two company-specific effects portfolios, namely, high and low, based on the first and the fifth quintile of each portfolio.

What are these unobservable factors?

Cressy and Farag (2011) point out that the unobservable firm factors might be interpretable as measures of firm quality. However, they were not able to show evidence to support this interpretation. To remedy this deficiency, in this article, we investigate possible empirical correlates for these unobserved factors. To this end, we choose market value added (MVA) as a proxy for management quality. MVA is defined as the management value added and is measured by the difference between the market value of the company and the value of its capital (equity) supplied by ordinary shareholders.

The literature emphasizes the increasing role of corporate governance (CG) as a means of improving company performance (Millstein and MacAvoy, 1998; Core *et al.*, 1999, 2006; Mallin, 2001, 2010; Brown and Caylor, 2004; Bhagat and Bolton, 2008). CG characteristics such as the separation of the roles of the CEO and chairman, board independence and various types of committees (e.g. remuneration and audit) are identified in the literature as keys to 'good' governance. We ask whether better CG characteristics explain company heterogeneity. Finally, we include as an empirical proxy for unobservables the role of political connections of the board of directors. Political connections in emerging markets have an important impact on stock price behaviour. We argue that the greater the political connections on the board the better a company's performance and the more it is subject to insider information. This suggests a higher degree of market inefficiency and greater permanent company-specific effects. We measure political connections by the presence of a minister, a member of parliament and by ruling party members on the board of directors. To empirically examine the effect of the above variables on company FEs, we carry out the following cross-sectional regression:

$$CSE_i = \alpha_i + \beta_1 MVA_i + \beta_2 CG_i + \beta_3 Polcon_{ii} + \varepsilon_i \tag{2}$$

where

CSE_i represents the company-specific effects;
MVA_i is the lagged company market value added measured by the difference between market and book value of equity;
CG_i is dummy variable takes the value of 1 for company (i) if it complies or partially complies with the Egyptian Corporate Governance Code, and 0 otherwise;[8]
$Polcon_i$ is dummy variable takes the value of 1 if there is a minister, member of parliament or ruling party member on the board of directors, and 0 otherwise;
ε_i is white noise error term.

[8] The Egyptian Corporate Governance code recommends firms to disclose in their annual reports whether or not they comply (fully or partially) with the code. There were few provisions for the Egyptian Corporate Governance code, which were, however, not mandatory. During the period of our study, only 12 companies of our sample have fully complied with the code, while the others have partially complied. We re-estimated Equation 2 controlling only for partial compliance and obtained similar results.

VI. Empirical Results

The descriptive statistics for the winner and loser events are presented in Table 1. The sample size is 100 companies over 120 days as test periods. The initial 1-day abnormal return on event day (AR_{i0}) for the winner and loser events are 7.11% and −5.60%, respectively.

Cumulative abnormal return (Car_{it}) over the event window (120 days) for the winner and loser portfolios are respectively −20.52% and 14.59%. This suggests that buying losers on average not only earns positive abnormal returns over the period following the event, but also that, as in DeBondt and Thaler (1985), these portfolios outperform the winner portfolios. The CARs 3 days before the event – as a proxy for the leakage of information (leak) – for the winner and loser portfolios are 0.66% and 1.07%, respectively. Average firm size (proxied by market capitalization) of the winners and losers are 312 million and 370 million Egyptian pounds, respectively. Finally, 50% of the sample was formerly state-owned companies. Table 2 presents the correlation matrix for the winners' and losers' covariates, respectively. The reported correlations show that there is no potential multicollinearity as neither of these correlations is above 0.50 or significant even at 10%.

Table 1. Descriptive statistics

	Mean	S.D	Skewness	Kurtosis
Panel A: Loser portfolios				
Car_{it}	0.1459	0.5331	0.8378	3.5184
AR_{i0}	−0.0560	0.0305	−0.9938	5.4384
Lnmcap	19.557	2.1201	−0.2359	3.4275
Leak	0.0107	0.0364	0.3326	3.9305
Private	0.5000	0.5051	0.0000	1.0000
Panel B: Winner portfolios				
Car_{it}	−0.2052	0.6675	0.2085	6.1621
AR_{i0}	0.0711	0.0389	1.3019	4.4327
Lnmcap	19.731	1.8593	−0.3922	3.6710
Leak	0.0066	0.0422	0.9448	4.0901
Private	0.5000	0.5051	0.0000	1.0000

Notes: CAR_{it} is the cumulative average abnormal returns over 120 days post-event. AR_{i0} represents the initial abnormal return in event day (t = 0). ln $mcap_i$ is the natural logarithm of the free-floated market cap of company i. Leak is the CAR for 3 days before event date and is used as a proxy for the leakage of information. $private_i$ is a dummy variable equal to 1 if the company was privately held before the IPO; and 0 otherwise. The number of observations is 12 000 observations (i.e. 100 companies * 120 days).

Table 2. Correlation matrix

	Lnmcap	ARio	Leak	Private
Panel A: Loser portfolios				
Lnmcap	1.0000			
ARio	−0.0388	1.0000		
Leak	0.0040	−0.1455	1.0000	
Private	0.1262	−0.2257	−0.2555	1.0000
Panel B: Winner portfolios				
Lnmcap	1.0000			
ARio	−0.1087	1.0000		
Leak	0.2641	0.3422	1.0000	
Private	0.2989	−0.0848	−0.0007	1.0000

Note: Number of observations is 12 000 observations (100 companies * 120 days).

Figure 1 presents the results of plotting CARs over time, for winners and loser portfolios over the entire event window (120 days).

It is clear from the figure that past loser portfolios outperform past winner portfolios, so that investors can achieve abnormal returns by selling winners and buying losers (the disposition effect). These results are consistent with the literature on price reversal (DeBondt and Thaler, 1985). Similar results were found by Cox and Peterson (1994), Larson and Madura (2003), Ma *et al.* (2005), and Farag and Cressy (2010).

System GMM dynamic panel data model

Table 3 presents the system GMM estimates of Equation 2 for loser and winner portfolios, within the 10- and 20-day windows.[9] The results reject the hypothesis that lagged CAR coefficient is zero. We interpret this as a rejection of a static model in favour of a dynamic model. Interestingly, the sign of lnmcap (our proxy for firm size) is positive for both losers and winners. This result does not support the small firm effect in the EGX.[10] The size coefficients are significant for losers portfolios, but insignificant for the winners. This may reflect the greater effect of size on the CAR in cases of negative shocks (the so-called 'leverage' effect; Cox and Peterson, 1994; Farag and Cressy, 2010). The coefficients for the initial abnormal returns on event day are negative and significant for both the winner and loser portfolios. This implies that the lower (greater) the initial negative (positive) shock the greater the cumulative abnormal returns subsequent to the event. This result is consistent with the price reversal phenomenon in case of large 1-day price decline.

[9] The system GMM estimator requires the number of time periods (T) to be smaller than the number of groups (N). To satisfy the assumptions of the system GMM, we checked whether our results were robust to using short windows (10 and 20 days), as well as 5-day (weekly) instead of daily returns. We also tried longer event windows for CARs (50 and 120 days). We found that our main results still held. The results based on short windows and weekly returns are not presented for brevity, but are available upon request.

[10] When we estimate Equation 2 using a cross-sectional regression, we find a negative relationship between firm size and the magnitude of price reversals. This result shows the potential bias resulting from ignoring company heterogeneity in a cross-sectional setting.

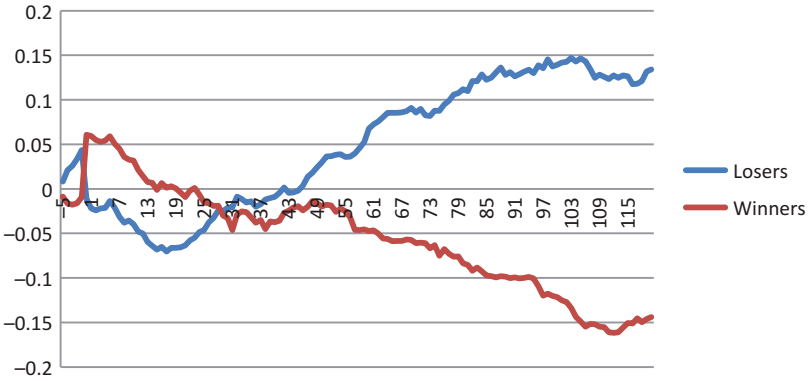

Fig. 1. Cumulative average abnormal returns for winners and loser portfolios over the event window

Table 3. System GMM estimates

	Loser portfolios		Winner portfolios	
	10 days	20 days	10 days	20 days
C	−0.0161***	−0.0106***	0.0052	−0.4708
	(0.0582)	(0.0034)	(0.0091)	(0.3103)
L.Carit	0.0698***	0.0749***	0.0376***	0.0423***
	(0.0085)	(0.0092)	(0.0061)	(0.0059)
Lnmcap	0.0006**	0.0004**	0.0008	0.0223
	(0.0003)	(0.0002)	(0.0006)	(0.0447)
ARio	−0.0292**	−0.0173***	−0.0195*	−0.1960**
	(0.0123)	(0.0061)	(0.0120)	(0.0982)
DumQ	−0.0026**	−0.0014**	−0.0014*	−0.0103*
	(0.0011)	(0.0006)	(0.0008)	(0.0064)
Leak	0.1648***	0.2232***	−0.1218***	−0.0739***
	(0.0338)	(0.0183)	(0.0251)	(0.0162)
Private	0.0004	0.0001	0.0018	0.0008
	(0.0010)	(0.0001)	(0.0012)	(0.0011)
Arellano Bond test for AR (1) (*p*-value)	0.011	0.015	0.005	0.007
Arellano Bond test for AR (2) (*p*-value)	0.406	0.317	0.502	0.609
Hansen test (*p*-value)	(0.368)	(0.568)	(0.499)	(0.372)

Notes: The table presents the estimation of Equation 2. L.Carit is lagged CARs over 10, 20, 50 and 120 days post-event. Ari0 is the initial abnormal return in event day (i.e. at t = 0). Lnmcap is the natural logarithm of the free-floated market capitalization of company i. Leak represents the CARs for 3 days before the event date and serves as a proxy for the leakage of information. Private i is a dummy variable = 1 if the company was privately held before IPO, and 0 otherwise. DumQ is a dummy variable takes the value of 1 if the company FE is positive within the estimation period, and 0 otherwise. The number of observations is 1000 (100 companies * 10 days) and 2000 observations (100 companies*20 days). Robust standard errors are between parentheses.
***, **, * indicate significance at the 1%, 5% and 10% levels.

This result is consistent with Cox and Peterson (1994), Larson and Madura (2003) and Farag and Cressy (2010).

The leakage of information variable displays a positive sign and is highly significant for loser portfolios, suggesting that the higher the leakage of (insider) information the greater the magnitude of price reversal. Yet, we find a negative and significant coefficient on the leakage of information variable for winner portfolios. This result reflects investor optimism and herding behaviour in case of good news (Larson and Madura, 2003). This, we believe, reflects the important role of insider information and thus the existence of significant market inefficiency in the EGX. Finally and more importantly, the DumQ variable (our proxy for company-specific effects) has a negative and highly significant coefficient for the loser portfolios, but a marginally insignificant coefficient for the winner portfolios. This suggests that low unobservable effect portfolios outperform high unobservable effects portfolios for the losers but not for the winners. This result is new to the literature on price overreaction and suggests that investors can earn abnormal returns by forming portfolios based on company-specific effects.

The specification tests reported at the foot of the table reject the absence of first-order but not second-order serial correlation. The models are well specified as the Hansen test does not reject the overidentifying restrictions.

The unobservable portfolios

To empirically identify the unobservable factors, Table 4 presents the estimates of Equation 2. We observe that management (market) value added (MVA, our proxy for the management quality) is negatively and significantly related to permanent differences in the company's reaction to news for both winner and loser portfolios. This suggests that better management quality is associated with smaller permanent differences in a company's reaction to news that affects its performance. Higher management quality suggests higher managerial efficiency and this in turn is reflected in stock price reactions. Therefore, the better the quality of management the more efficiently are the stock priced and the less permanent firms' overreaction to news. This result is consistent with Cressy and Farag (2011).

Table 4. Cross-sectional regressions for the unobservable factors

	Losers	Winners
C	0.0019	0.0417***
	(0.0123)	(0.0071)
MVA	−0.0009***	−0.0004**
	(0.0002)	(0.0002)
Pol	0.0038**	0.0068**
	(0.0015)	(0.0034)
CG	−0.0275*	−0.0151
	(0.0162)	(0.0099)
R^2	0.3265	0.3078
Adj R^2	0.2712	0.2467
F stat	3.6125***	3.1785***
White test for heteroscedasticity	0.6849	0.5327

Notes: The table presents the results of OLS regression of Equation 2. MVA is the lagged company market value added measured by the difference between market and book value of equity. CGi is dummy variable takes the value of 1 for company (i) if it complies or partially complies with the Egyptian Corporate Governance Code, and 0 otherwise. Polcon is dummy variable takes the value of 1 if there is a minister, member of parliament, member or ruling party member on the board of directors, and 0 otherwise. Number of observations is 100 observations. Robust standard errors are between parentheses.
***, **, * indicate significance at the 1%, 5% and 10% levels.

The political connection variable displays a positive and significant effect for both winners and loser portfolios. This suggests that the higher degree of political connections the firm has, the higher the company's heterogeneity. We argue that political connections may increase the role of insider information in emerging markets and thus this is reflected into greater company heterogeneity. The corporate governance dummy (CG) has a negative coefficient, which is marginally significant for the losers. The negative sign may be interpreted as meaning that the better corporate governance characteristics the lowers firm specific effects and thus higher overreaction to market shocks. The sustainability in the management policies and company's strategic objectives are possible interpretations for this inverse relationship.

The models are well specified as *F*-statistics are highly significant. The adjusted R^2 is 27% and 24% for both loser and winner portfolios, respectively. In addition, the residuals seem homoscedastic as the results of white tests are insignificant.[11]

Figures 2 and 3 present the CARs for both unobservable (company-specific effects) and size portfolios for the

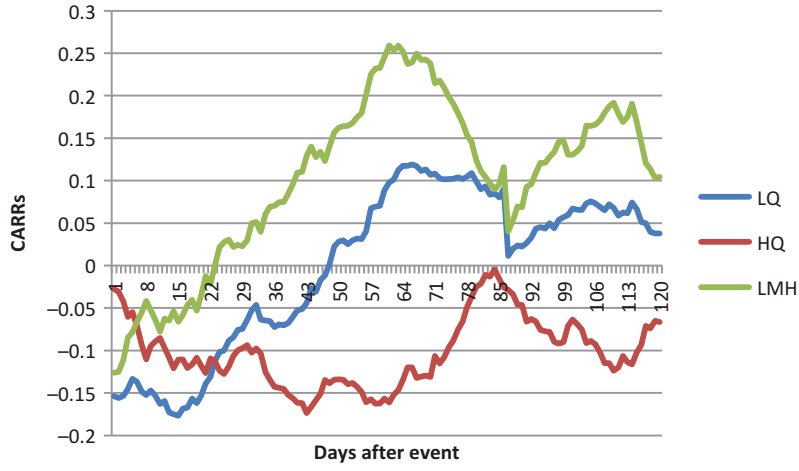

Fig. 2. Unobservable portfolios for the losers

[11] The correlation matrix (not reported but available upon request) indicates that there is no potential correlation between the independent variables. We also examine the potential endogeneity between a company's unobserved factors and the independent variables. As the Hausman test cannot reject the null that the regressors are exogenous, we conclude that there is no potential endogeneity problem in the estimation, particularly between MVA and the company's unobserved factors.

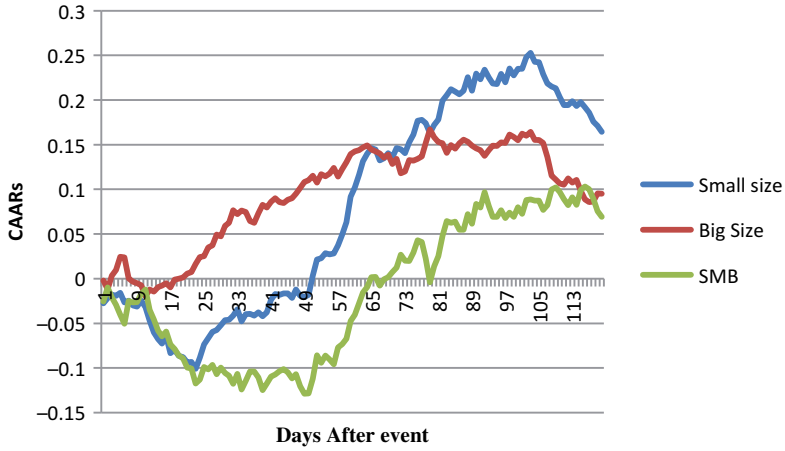

Fig. 3. Size portfolios for the losers

losers. It is clear that in case of bad news (losers), low specific-effects portfolios outperform high specific-effects ones. Moreover, the arbitrage portfolios (low minus high) LMH outperform (small minus big) SMB portfolios on average.[12]

VII. Summary and Conclusions

Existing empirical studies of stock price reversal have used either cross-sectional or time-series regressions. We argue that this may lead to potential biases in the results. Existing studies also ignore the dynamic aspects of overreaction. In this article, we used Egyptian stock market data and dynamic panel data methods to deal with these problems. Unobservable factors reflecting company heterogeneity emerge automatically from this estimation process, and we have investigated their potential role as criteria for portfolio formation. We found evidence of the short-term overreaction phenomenon in the EGX as the coefficients for the initial abnormal returns on event day are negative and significant for the winners and losers. This implies that the lower (greater) the initial negative (positive) shock the greater the cumulative abnormal returns subsequent to the event. This result is consistent with the price reversal phenomenon in case of large 1-day price decline. We also found evidence that the leakage of information for both winners and losers. This, we believe, reflects the important role of insider information and thus market inefficiency in the EGX.

Moreover, we did not find evidence of small firm effect as the sign of market capitalization (our proxy for firm size) was positive for both losers and winners. More importantly, including the DumQ variable (our proxy for company unobservables) in the system GMM suggests that low-company-specific effects portfolios outperform those of high specific effects. Moreover, we also found that unobservable portfolios (LMH) outperform traditional size (SMB) portfolios. This result is new to the literature as we argue that the portfolio formation based on company-specific effects may be used as a new profitable construction strategy to achieve higher abnormal return than the size portfolios.

To identify the potential unobservable factors, we found positive and significant relationship between the political connections of the board members and the company heterogeneity in addition, and interestingly, we found an inverse relationship between both management quality and corporate governance compliance and the company heterogeneity. We conclude that investors can exploit the Egyptian market imperfection and achieve abnormal returns as the results of dramatic price changes. In addition, dynamic panel data approach adds a new dimension to the existing models and offers interesting insights and reveals the significant role of unobservable firm-specific factors in addition to the observable size in the analysis of the overreaction phenomenon. Finally, constructing portfolios based on some unobserved factors, i.e. management quality, corporate governance and political connections of board members, significantly outperform traditional portfsolios based on size.

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[12] We obtained opposite patterns and results when plotting the cumulative average abnormal returns for both size and unobservable (fixed-effects (FEs)) portfolios for the winners. Specifically, high FEs winners outperformed low FEs portfolios on average. However, small-size portfolios outperformed those of big size on average.

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