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COMPARISON OF THE EUROPEAN AND THE U.S. UNREGULATED STOCK MARKETS DESIGNED FOR SMEs

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ABSTRACT

This paper compares the performances of the European and the U.S. unregulated stock markets using the weekly adjusted closing index prices of Euronext all share index, NYSE AMEX Composite Index, and the OTCM ADR Index for the 2013-2017 period or 261 observations each. ADF, EGARCH, and ARCH tests have been applied on the collected time series data to measure and forecast index prices volatility, risk and return. The results obtained from the tests and analysis show a high levels of price volatility in some periods; but a permanent effect of shocks has not been observed in the long term for all the analysed indexes. It is also seen that negative shocks cause more volatility than positive shocks. However, an overall result has shown that the Euronext all share index despite slight declines displays an upward trend and relatively higher returns with less risk than the NYSE AMEX Composite Index and the OTCM ADR Index; reflecting the better performance of the European unregulated market compare to its U.S. counterparts.

Keywords: Small and Medium Enterprises, Stock markets, Initial Public offering, index prices, financial risk and return

JEL Classification: M130, G1, C120, C220

Introduction

As the key drivers of innovation, the source of job creation and growth in all economies, although a significant amount of reports and studies have been conducted regarding small and medium enterprises (SMEs) in the American, the Asian, the European unregulated stock markets and elsewhere (Hall 2007; OICV IOSCO 2015; Bremus 2015; Kiškis et al. 2016; Kentaro 2016 and others); studies comparing unregulated stock markets performances with one other locally or internationally are scarce. Therefore, this study bridges the gap by identifying the stock markets specially designed for SMEs, highlights the conditions under which they are listed in term of IPO (Initial Public Offering) requirements in the European and the U.S unregulated stock market; then, based on index prices accesses their performances throughout the measurement of volatility, risk and return. EGARCH-M and ARCH LM models were also applied to evaluate the asymmetrical impacts of positive and negative shocks on volatility.

For our analysis, weekly adjusted closing stock prices of the major pan-European unregulated stock market (Euronext All Share index) and the weekly adjusted closing prices of the two main American unregulated markets (NYSE AMEX Composite index and the OTC ADR index) were adopted. It must be noted that subordinate questions such as, what are the respective definitions of SMEs in Europe and the U.S.? what are the stock markets specially designed for SMEs in the two blocs? have been asked to support the development of this study.

Even if none of the two markets should be regarded or considered superior to the other, as both have their strengths and weaknesses, this research give insight to investors looking for investment opportunities and SMEs mangers seeking financing sources. The remainder of the paper is organized as follows. The first section highlights the theoretical framework of the study. The second presents the data and methodology used in our analysis. And the last two parts discuss the results and provide a conclusion.

Literature Review

In this section we present an overview of SMEs in the two sides of the Atlantic. We begin with SMEs financing difficulties then discussed the pros and cons of an IPO and finally investigate the effects of SMEs on both economies.

SMEs financing difficulties appear to be one of the most recurrent economics debates; that fact has been aggravated by the outbreak of the 2008 financial

crises that have knocked down the world economy, making banks intensify regulations on credit granting; investors becoming tougher in their required guarantees and conditions to finance projects (Wehinger 2013; Udell 2015; Akala 2017); likewise, loan rejections increased 2,5 times since 2008 compared to 2004 from 6.1% to 16.3% (Sannajust 2014), according to the International Finance Corporation (IFC), to satisfy SMEs formal demands around the world, credit had to increase between U.S $900 to $1 100 billion in 2011 (Alves de la Camapa 2013). In brief, financial institutions have revised their credit requirements upward. Thus, unlike large businesses, SMEs find themselves in increasingly complex and arduous situation regarding financing from external sources due to the credit crunch caused by the economic downturns.

In regard to the financing difficulties encountered by SMEs, one of the other alternatives available is stock market (Gupta and Saini 2016); besides being an alternative, most enterprises start as small private business and at some point, in their growth strategy decide to go public to allow the enterprises share to become more liquid (Chemmanur and Fulghieri 1999). The decision of going public confers to the shares comprising the capital of a company several advantages compared to those of an unlisted company which source of financing is more often guaranteed by auto-financing, bank credit lines, leasing, bank loans or one large investor (institutional investor, venture capitalist, crowdfunding, or angel) reported the European Central Bank (ECB) in 2017. Similarly, the periodic dissemination of information related to the evolution, the prospects of a listed company guarantees the interests of minority shareholders; that can also facilitate the mergers and acquisition (M&A) process (Chod and Lyandres 2008) because it increases the company's visibility, improves information availability to external agents; and as a result, increases public awareness of the company and its products (Stoughton et al. 2001). An IPO makes it possible to call external investors to carry out projects that companies can't undertake on their own due to the lack of financial means or don't want to finance alone because of the risk factor; therefore, an IPO will allow spreading the risk and significantly minimize its effects. A listed company's evolution is followed and analysed by financial analysts and investors; that market surveillance puts pressure on managers and encourages them to manage the company in the best way to avoid sanctions or decline in shares prices (Bharat and Dittmar 2010). An IPO is therefore a powerful tool for companies seeking funding for development.

Notwithstanding these advantages, the European Commission (EC) survey on the access to finance of enterprises in 2014, and the European Saving and Retail Banking Group (ESRB) report in 2016 have shown that banks remain the main source of finance for SMEs 69% in the U.S., and 60% in the EU. And this is due

to the facts that an IPO may course a loss of managerial autonomy (Boot et al. 2006); reduction or loss of private benefits related to capital ownership (Zingales 1995); the public disclosure of financial information by a listed company can damage its competitiveness in the market in favour of their competitor (Farre-Mensa 2010). Therefore, companies are incited no to disclosure all strategic information in order to limit competition. However, the retention of valuable information can also be interpreted by the investor as a bad news signal (Pozniak and Guillemette 2013). In fact, the listing of companies shares entails significant and different costs such as admission fees, underwriting fees, annual fees, recurrent costs of production and disclosure of information to the market (financial reports in accordance with the regulatory standards, time spent by the manager to make those information available, financial communication… etc.) (Pagano 1993).

However, the root factor of interest and devotion of economists toward SMEs is essentially due to their large contribution to the economic growth. In 2015, the European Bank for Reconstruction and Development (EBRD) demonstrated that "SMEs make up over 99% of the total number of businesses…They are responsible for large contribution to value added and employment in the countries where they operate"; according to EC, "SMEs represent 99,8% off all enterprises in the non-financial business sector accounting for 67% of total in the European Union (EU)"; in 2016, the U.S. Small Business Administration (SBA) report indicated that, SMEs represent 99.7% of the U.S. all businesses and offer 48% of employment; and similarly, from the database of companies subject to VAT (Delporte, 2017), in 2015 there were 869 662 businesses in Belgium, of which 863 165 (99.25%) SMEs, generated nearly 70% of jobs and 62.3% of value added in the private sector

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Theoretical framework

To conduct our analysis, it is necessary to precisely define the meaning of SMEs and display their IPO conditions respectively in the European and the U.S. stock markets.

SMEs definitions

The factors determining whether an enterprise is an SME or not in Europe are:

a. Staff headcount
b. Either turnover or balance sheet total

Table 1: SME defined as in EU recommendation

Enterprises Category	Staff Headcount	Turnover	Balance Sheet Total
Medium-sized	< 250	≤ € 50 million	≤ € 43 million
Small	< 50	≤ € 10 million	≤ € 10 million
Micro	< 10	≤ € 2 million	≤ € 2 million

Source: EC (2005: 5)

This table presents enterprises categories with their classification criteria under the EU recommendations.

The EC (2005: 5) categorized SMEs as enterprises which employees are fewer than 250 and have an annual turnover not exceeding € 50 million and an annual balance sheet not exceeding € 43 million.

However, in the U.S. the definition varies by sector based on the North American Industry Classification System (NAICS: https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf). The U.S. SBA provides a list of business size standards matched to the NAICS codes. In manufacturing, for instance, an SME is defined as a business having 500 employees or less, but in a wholesale trade business it is 100 employees or less, and up to 250 employees for businesses involved in mining or silver.

To facilitate and allowed a consistent general classification of SMEs, the U.S. International Trade Commission (USITC 2010) defined SMEs as "firms that employ fewer than 500 employees"

It follows from the foregoing information that, the European definition of SMEs is not universal; the definition widely varies according to countries policies, companies' revenues, number of employees, capital, turnover, market position… etc. In China, for instance, SMEs are defined as "different form of enterprises under different ownership that are established within the People's Republic of China that meet the social needs and create more job opportunities and comply with the industrial policy of the state" (World Trade organisation 2014).

The European and the U.S. stock markets specially designed for SMEs and their IPO requirements

Capital raising or credit granting are more often SMEs daunting challenge, especially in their early age (Start-up phase). In Europe SMEs access to finance went from 16% in 2009 to 7% in 2017, with the three most important sources of financing being: credit line (suitable for 53% of SMEs), leasing (for 48% of SMEs) and Stock Market (for only 12 % of SMEs) is considered to be among the less percentage of SMEs source of financing compare to large companies (ECB 2017).

Stock markets aim to provide SMEs with a platform to raise fund. Several research has stressed the existence of separate markets specially designed for SMEs (Canada, Denmark, Germany, Italy, Poland, Spain… etc.) with less stringent requirement than the main stock market; a few other studies reported that there are no separate markets for SMEs and large firms in countries like Greece, Hungary, Romania, Slovenia …etc (OICU-IOSCO final report 2015).

Generally, enterprises go public through two types of stock markets. Either on a regulated market where securities are traded in a safe, standardized, faster and publicly transparent manner (large companies use those market to raise fund and trade their securities); or unregulated market where enterprises don't need to comply with the stringent listing requirement imposed in regulated markets, or when companies do not want to pay the high cost of being listed in those markets. Unregulated marked basically allow SMEs and Start-ups to trade their securities with less cost and less obligation to allow them to focus on their main business activities. However, fewer regulations also mean less public transparency, and therefore very risky.

Unregulated stock Markets In Europe

The Alternative Investment Market (AIM)

It was launched on 19th June 1995, in the UK, by the most reputed stock market in Europe: the London Stock Exchange to help SMEs grow and raise the capital they need for expansion. AIM complies with the national law as well as some EC regulations, and issue specific notes for each listed company (AIM rules for companies 2018). It has financed over 3 600 companies across the world since 1995, starting with a market volume of £82.2 million (€93.2 M) and a turnover of £270,2 million (€306,40 M); in 2017, its market volume has reached £ 104763 million (€118786 M) with a turnover volume of £672370.5 million (€762399 M)

and has raised up to £105443.37 million (€119546 M) since 1995 (AIM Statistics - November 2017). In the light of all these positive stats, AIM has become in recent decades a reference and model of stock markets dedicated to SMEs and start-ups seeking for financial resources. There are three indexes maintained by the FTSE Group to measure AIM Group performances: the FTSE AIM UK 50 index, the FTSE AIM 100 index and the FTSE AIM All-Share index.

With the same objectives of supporting SMEs, AIM Italia was created in 2010 after the merge between Borsa Italiana S.P.A (base in Milan it is the only Italian stock market) and LSE in 2007.

Table 2: The LSE and the AIM listing criteria

Conditions for admission	AIM	LSE main list
Floating capital	No minimum	Require a minimum of 25% shares owned by the public
Financial information	No history required	3years history
% of entity activities supported by income	No	75%
Control over the majority of assets of the entity (3 years)	No	Yes
Sufficient working capital	Yes	Yes
Market capitalization	No minimum	required £700,000
Profitability	No	No
Role of the advisors	Nomad required during the IPO and after	A sponsor
Admission documents	Admission documents under the responsibility of the Nomad	Admission documents reviewed by the UKLA

Source: London Stock Exchange
https://www.nibusinessinfo.co.uk/content/requirements-joining-aim

This table summarises enterprises listing criteria in the LSE and the AIM.

As an ongoing financial principle disclosure, AIM enterprises should provide a half-yearly report and account, any delay or default is subject to suspension; depending on the market capitalisation, the admission fee for AIM may vary from £7,057 to £79,601; and the annual fee for each company is £ 5,899.

Euronext NV

Created in 2000, EuronextNV is the European regulated stock exchange market which becomes the largest in continental Europe with 1 300 issuers representing €3,6 trillion market capitalization. EuronextNV daily cash average transaction

volume peaked at €7,783 million (December 2017), reaching a new yearly volume record of €18,524 million (Euronext, Dec. 2017). EuronextNV is located in Amsterdam (headquarter), Brussels, London, Lisbon, and Paris. It is the main trading centre of the Euro-zone and its main listing indexes are CAC 40, PSI 20, AEX 20, BEL 20, etc.

Euronext NV accounts unregulated markets

Alternext (Euronext Growth)

Inspired by AIM, a new stock market dedicated to SMEs at the European level was created in 2005. Alternext, which became Euronext Growth in June 2017 was created by Euronext Paris and latterly joined by Euronext Brussels in 2006, Euronext Amsterdam and Euronext Lisbon in 2011 to help SMEs of the Euro-zone to raise funds as it is becoming more expensive and harder for enterprises to access the Euronext NV. Euronext Growth all share Index (ALASI or ALASN) illustrates the performances of all the companies listed on of Euronext growth.

Enternext created in 2013 as a branch of Alternext is a pan-European program launched to boost SMEs equities, and to particularly give the Tech sector impetus.

The Free Market (Euronext Access)

The Free Market (Brussels, Lisbon, and Paris) which also become Euronext Access in June 2017, is a market particularly suitable for SMEs wishing to increase their visibility and reputation through stock market with less listing requirement compared to Alternext. With the same goals, a new compartment of Euronext Access called Euronext Access+ has also been designed to finance start-ups and fast-growing SMEs.

Table 3: Euronext Listing requirements

MAIN ELIGIBILITY CRITERIA			
	Euronext European Regulated Markets	Alternext (Euronext Growth)	Free Markets (Euronext Access)
Free float	Minimum of 25% of share capital or 5% if this represents at least EUR 5 million	EUR 2.5 million (public offer)	Not Applicable (N/A)
Track record	Three years financial statements	EUR2.5 million (private placement within one year with a minimum of three investors) EUR 2.5 million (on another market) At least two years financial statements	Two years of financial statements recommended
Accounting standards	IFRS or equivalent accounting standards (including US, Canada, China and Japan)	EEA Company: IFRS or national GAAP	Optional IFRS or national accounting standards
Prospectus / Information Document	Prospectus approved by Competent Authority	Non-EEA Company: IFRS or equivalent accounting standards (in case of public offer) and IFRS, equivalent accounting standards (including US, Canada, China and Japan) or national accounting standards with reconciliation table (in case of private placement or direct listing)	Prospectus approved by the Regulator in case of a public offer

Source: Euronext https://www.euronext.com/fr/node/18959

This table summarises enterprises listing criteria in the Euronext regulated and unregulated markets.

Table 4: Ongoing Requirements

	Euronext European Regulated Markets	Alternext Euronext Growth	Free Markets (Euronext Access)
Financial Reporting	Audited annual and semiannual financial statements Price sensitive information	Limited number of threshold declarations: 25, 30, 50, 75 and 95% of voting rights	No reporting of periodic obligations Price sensitive information
Declaration	Multiple threshold declarations: Multiples of 5% of voting rights		No reporting of major holdings
Insider List	Yes	Yes	Yes
Declaration of Manager Transactions	Yes	Yes	Yes

Source: Euronext listing
http://www.ban.be/Data/Documents/qlj3p286/28/Presentatie_VVDessel_2016.pdf

This table summarizes enterprises ongoing listing requirements in the Euronext unregulated market.

There is also a Capital Market Union (CMU) which is a plan launched by the European Union commission to unlock, mobilize and diversify the funding channels available to SMEs in Europe, strengthening the capacity of EU capital markets, and facilitating cross-border investment by 2019.

Beside the pan-European stock markets, there are national stock market design for the promotion of SMEs, such as Deutsche Börse Group of Germany; MAB stock market (the Spanish AIM) of Spain; Alternative Market in Greece, as described by the MiFID (Markets in Financial Instruments Directive) of the EU operates on the main market as a multilateral trading facility; the Irish Enterprise Exchange (launched by the ISE: the Irish Stock Exchange) of Ireland; Bern eXchange (BX) of Switzerland, OPEX stock exchange of Portugal, First North (Stockholm, Iceland and Helsinki) …etc.

Unregulated stock markets in the U.S.

The two-renowned national regulated stock markets in the U.S. are the NYSE and NASDAQ (began trading over the counter since 1971 till its exchange has grown to become the second largest regulated exchange market in the world after NYSE).

NYSE America

Formerly known as the American Stock Exchange (AMEX), NYSE Alternext U.S. in 2008 after integrating the European Alternext and lately NYSE America in 2016; with the 10% of all security trade in the U.S., NYSE America is the third largest stock market by trading volume after the NYSE & NASDAQ ; it is a branch of the NYSE. NYSE America is known to have flexible listing rules for US small-cap companies including foreign companies, mostly Canadian. The NYSE America main indexes are XFI (NYSE American composite for financial subsector), XHL (NYSE American composite healthcare subsector), XID (NYSE American composite industrial subsector), XNA (NYSE American composite natural resources subsector), XIT (NYSE American composite technology subsector). However, for a quick overall movement of the NYSE American market, the XAX index is used.

Table 5: NYSE America IPO listing standards

	standard 1	standard 2	standard 3	standard 4a	standard 4b
Pre-Tax Income	$750,000	n/a	n/a	n/a	n/a
Market Cap	n/a	n/a	$50 MM	$75 MM	n/a
Total Assets And Total Revenue	n/a	n/a	n/a	n/a	$75 MM
Market Value Of Public Float	$3 MM	$15 MM	$15 MM	20 MM	$20 MM
Stockholders' Equity	$4 MM	$4 MM	$4 MM	n/a	n/a
Minimum Price	$3	$3	$2	$3	$3
Operating History	2 YEARS				

Source: New York Stock Exchange

This table summarises enterprises listing criteria in the NYSE America.

And one of the following:

Table 6: NYSE America IPO options

	Option 1	Option 2	Option 3
Public Share Holders	800	400	400
Public Float	500,00	1,000,000	500,000
Daily Trading Volume	n/a	n/a	200 Shares

Source: New York Stock Exchange

This table summarises enterprises ongoing listing requirements in the NYSE America.

OTC Markets Group

The U.S. unregulated stock markets or OTC (Over-The-Counter) Markets Group which has its headquarter in New York City is the market where securities are traded between two parties without the supervision of an exchange (organized market). The security price is not necessarily published for the public. With a total securities of 10347, 15.2 billion of share and a market volume of $ US 2.2 billion; OTCQX, OTCQB, and Pink companies represent 95% of the trade volume of the OTC market group. Apart from OTCQX which has rules including financial requirement, OTCQB and Pink Markets can include distressed, speculative as well as high-quality companies.

OTCQX: In the OTC market group, though they seem very similar, the OTCQX listing criteria is divided into 2 groups (the U.S. local companies, and international companies). It has two tiers of the U.S. companies quotation: OTCQX U.S. & OTCQX U.S Premier; and another two tiers: OTCQX International & OTCQX International Premier. To be traded on that market, companies must be registered with the U.S. security exchange commission (SEC), follow best practice corporate governance, demonstrate compliance with U.S. security law, undergo an audit and qualitative review by the OTC market group, and disclose financial information. SMEs can upgrade from OTCQB to OTCQX if they meet the above-mentioned requirements.

OTCQB: is a market for SMEs that are not yet qualified for the OTCQX market due to the fact that they are in the early stage of their development. To be traded on OTCQB market, companies must not be bankrupted, undergo an annual audit by the U.S. Public Company Accounting Oversight Board (PCAOB) auditor, comply with the $0.01 (one penny) bid price requirement, pay a one-time application fee of $2500 and an annual fee of $10 000 per year. Pink companies that comply with the OTCQB requirements are allowed to upgrade from Pink to OTCQB.

Table 7: OTCQX, OTCQB, and OTC Link markets eligibility & requirements

	OTCQX	OTCQB	PINK
ELIGIBILITY REQUIREMENT	Be listed on a Qualified Foreign Exchange or be an SEC Reporting Company Not be a Shell Company or Blank-Check Company Not be subject to any Bankruptcy or reorganization proceedings Submit a Letter of Introduction from an OTCQX Sponsor	U.S. companies must have audited annual financials by a PCAOB auditor. (Regulation A Companies are exempt from the initial requirement) Minimum bid price of $0.01 Not be in bankruptcy International companies must be listed on a Qualified Foreign Exchange (or SEC Reporting) and submit a Letter of Introduction from an approved OTCQB Sponsor	N/A
REPORTING REQUIREMENT	SEC Reporting Standard Regulation A Reporting Standard Alternative Reporting Standard Audited annual financials by PCAOB Timely disclosure of material news releases	SEC Reporting Standard Regulation A Reporting Standard U.S. Bank Reporting Standard International Reporting Standard Alternative Reporting Standard Timely disclosure of material news	based on the level of disclosure and public information made available by the company either through the SEC or posted on OTC market

CORPORATE REQUIREMENT	Have a board of directors that includes at least 2 Independent Directors Have an Audit Committee, a majority of the members of which are Independent Directors; and Conduct annual shareholders' meetings and make annual financial reports available to its shareholders at least 15 calendar days prior to such meetings	Have a board of directors that includes at least two Independent Directors Have an Audit Committee, a majority of the members of which are Independent Directors	N/A
FEE	Application Fee: Non-refundable fee of $1,000 U.S. Annual Fee: $1,000	Application Fee: $2,500 Annual Fee: $10,000 per year ($12,000 effective January 1, 2018)	Application Fee: $500 U.S. Annual Fee: $4200 U.S.
FINANCIAL STANDARD	refer to table 5	Non-SEC Reporting Companies: Disclosure must be posted for the prior two years SEC-Reporting Companies: Must be current in all periodic reporting requirements on EDGAR	N/A

Sources: OTC Markets

Pink OTC Market is a market with less or none financial requirement, no reporting standards, its quoted enterprises are not required to register with the SEC. Therefore, it is very difficult for investors to find current and reliable information about those enterprises; what classifies the Pink market among the riskiest investment. Pink OTC market or OTC Link is a member of the Financial Industry Regulation Authority (FINRA) registered with SEC as a broker-dealer and as an alternative trading system.

Table 7 summarizes enterprises listing criteria in the OTC markets Group.

Despite some slight differences, unregulated markets have in common conditions of introduction and listing lightened compared to the regulated market, especially in terms of eligibility (capital size, profitability, floating …) listing fees, and financial disclosure.

In the U.S. IPOs have helped several SMEs to become giant (Amazon, E-bay, Yahoo…). However, since the subprime crisis, the listed companies in stock exchange markets have been decreasing (81%), and the SMEs IPO book runners number has decreased from 162(1994) to 31(2014); while it has seen a substantial growth in Europe and Asia (Weild and Kim 2015).

DATA AND METHODOLOGY

For the purpose of this study, this paper used the weekly adjusted closing historical index prices data of Euronext Growth All share index (ALASN) (the biggest international unregulated stock Market on continental Europe designed for SMEs); NYSE AMEX Composite Index (XAX) and OTCM ADR Index (OTCDR) from January 1st, 2013 to December 31st, 2017 or 261 observations. The weekly index prices have been retrieved from www.investing.com. After calculating the average weekly return, the variance and the standard deviation of each index, these following tests have been applied:

Augmented Dickey Fuller Test or Unit Root Test

A systematic change in the mean and variance of the examined time series causes the models to give misleading results. In non-stationary series, the effect on indexes is observed to be permanent. This invalidates the efficient market hypothesis. For that reason, we tested the stationarity of the time series.

The Augmented Dickey Fuller Test (ADF Test) is one of the most commonly used tests for the stationarity of a time series. The test is derived from the DF test developed by Dickey and Fuller in 1979.

$$\Delta y_t = (\rho - 1)y_{t-1} + u_t = \delta y_{t-1} + u_t \quad (1)$$

Δyt: First difference of dependent variable (yt-yt-1)

Null hypothesis: δ =0

The error involved in the DF test may impair the co-variance hypothesis and may indicate heteroscedasticity or autocorrelation. To solve that problem, the DF model is modified by adding delayed values to the dependent variable, what led to the ADF model (Dickey and Fuller 1981).

$$\Delta y_t = \delta y_{t-1} + \sum_{i=1}^{\rho} \delta y_{t-1} + u_t \quad (2)$$

There are two more models that are created by adding intercept constant and trend variables to the model above.

The time series used in ARCH and derivative analyses should not contain unit roots due to the above-mentioned reasons. Although the unit root entity is included in the advanced stage models, it is useful to perform the unit root test first.

Exponential Generalized Autoregressive Conditional Heteroscedastic Model In Mean (EGARCH-M)

High returns mean high risk for financial investments. The Capital Asset Pricing Model explains the risk and returns relationship (Teynor 1961-1962; Linter 1965; Mossin 1966; Sharp 1972). The standard GARCH model does not include the relationship between risk and return. The study that added it was done in 1987 by Engle, Lilien and Robins Engle. The model is called ARCH-M and GARCH-M. In ARCH-M and GARCH-M models, conditional variance is added to standard ARCH and GARCH models. Conditional variance is a measure of volatility in the series.

Below is an ARCH-M model:

$$r_t = \sum_{k=1}^{m} \lambda_k x_k + \varphi \sigma_t^2 + u_t$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i u_{t-i}^2$$

$$u_t \sim N(0, \sigma_t^2)$$

$$u_{j,t} | F_{t-1} \sim N(0, \sigma_t^2) \quad (3)$$

rt: Risk premium in time t
xk: Exogenous variables
ut: Error term
δ2: Conditional variance

GARCH-M model:

$$r_t = \sum_{k=1}^{m} \lambda_k x_k + \varphi \sigma_t^2 + u_t$$

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{p} \alpha_i u_{t-i}^2 + \sum_{i=1}^{q} \beta_i \sigma_{t-i}^2$$

$$u_t \sim N(0, \sigma_t^2) \quad (4)$$

rt: Risk premium in time t
xk: Exogenous variables
ut: Error term
δ2: Conditional variance

The φ parameter refers to the response to the changes in volatility; it is the part that adds the risk-return relation to the model.

The other issue is that, there is a usual belief that the bad news effect on a stock price is high than the good news effect. In many markets, there is the presence of a negative correlation between return on time t and volatility on t+n. From that

point of view, the volatility will decrease when the stock return increases and the volatility increase when the stock returns decrease. This asymmetrical movement is called "leverage effect" (Black 1976).

The standard GARCH model does not include the leverage effect. In his 1991 work, Nelson developed the EGARCH model by adding it.

An EGARCH model:

$$r_t = \mu + \sum_{i=1}^{p1} \alpha_i r_{t-i} + \sum_{i=1}^{p2} \beta_i u_{t-i} + u_t$$

$$ln(\sigma_t^2) = \alpha_0 + \sum_{i=1}^{p} \beta_i \, ln(\sigma_{t-i}^2) + \sum_{i=1}^{q} \alpha_i \left|\frac{u_{t-i}}{\sigma_{t-i}}\right| + \sum_{i=1}^{p} \gamma_i \frac{u_{t-i}}{\sigma_{t-i}} \quad (5)$$

rt: Risk premium in time t
ut: Error term
δ2: Conditional variance

The parameter γ in the equation is an indication of the asymmetric effect of the shocks. If the parameter is statistically significant and negative, it indicates that the effect of bad shocks is higher than good shocks. The EGARCH-M model appears when the first part of this model is added to the conditional variance term with the φ parameter in the same section of the GARCH-M model,. In this way, both the asymmetric effect of shocks and the risk-return relationship can be observed as long memory.

RESULTS

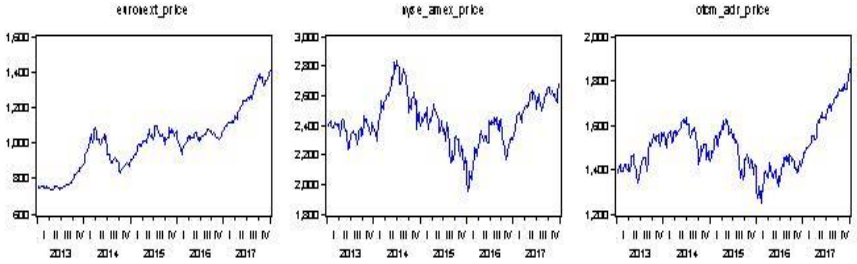
This table presents the summery statistics including the average returns, the standard deviation and the correlation.

Table 9: ALASN, NYSE Amex and OTC ADR summery statistics

Average return ALASN	0.262%
Average return XAC	0.063%
Average return OTCDR	0.129%
Std dev ALASN	0.0159
Std dev XAC	0.0194
Std dev OTCDR	0.0175
Correlation	r
Correl. ALASN,XAC	0.2416
Correl. ALASN,OTCDR	0.3605

From the average returns and the standard deviations, ALASN displays a higher return with less risk compare to NYSE Amex and OTC ADR; and from the correlation coefficients, a very weak uphill (positive) linear relationship is observed between the indexes.

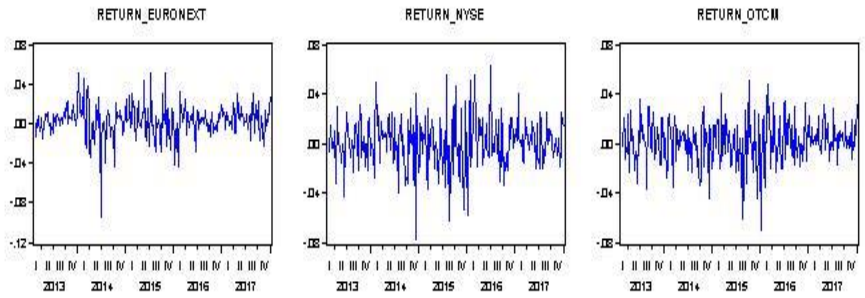
Figure 1: ALASN, NYSE AMEX, and OTCM ADR index prices



This figure shows the price trends of ALASN, NYSE AMEX, and OTC ADR from 2013 to 2017.

The logarithmic chart of the Euronext All Share despite a slight decline, the index shows an upward trend compare to its counterpart NYSE Amex and OTC ADR which even though show some upward trend in the last recent years suffer from serious fluctuations in previous years. This Indeed, shows better results of Euronext All Share compare to NYSE Amex and OTC ADR. However, we can see a slight decline in all the three index prices around 2014; which may be caused by the unprecedented drop in oil prices which has blown a wave of panic on all stock markets (Mead and Stiger 2015).

Figure 2: ALASN, NYSE AMEX, and OTCM ADR indexes Returns



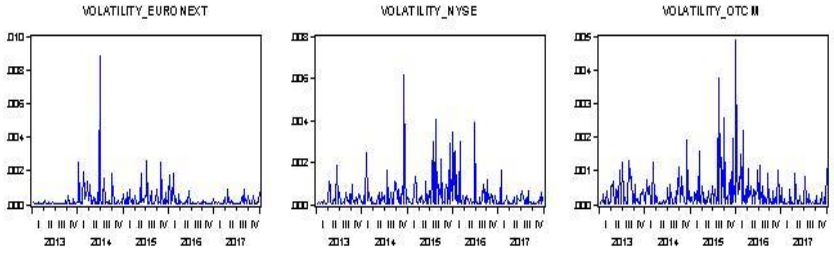
This figure shows the return trends of ALASN, NYSE AMEX, and OTC ADR from 2013 to 2017.

The return values of the series in the graphs above are calculated using the following formula:

$$r_t = \left(\frac{P_t}{P_{t-1}}\right) \tag{6}$$

rt : Return in time t
Pt : Stock market value at time t
Pt-1: Stock market value at time t-1

Figure 3: ALASN, NYSE AMEX, and OTCM ADR indexes volatilities



This figure shows the volatility trends of ALASN, NYSE AMEX, and OTC ADR from 2013 to 2017.

Econometrically, the upward trend reflects that the time series is not stationary in expectancy, and similarly, the persistent fluctuations show that it is not stationary invariance. To test the stationarity of the return the ADF test was applied.

Table 9: ADF Test

Critical Value of EURONEXT	-6.742
Selected lag length2	3
Prob3	0.0000***
Critical Value of NYSE AMEX	-4.712
Selected lag length	13
Prob.	0.0001***
Critical Value of OTCM ADR	-6.571
Selected lag length	6
Prob.	0.0000***
H0: Series has a unit root Significance: ***0.01 **0.05 *0.1	
1: Intercept model 2: (Automatic - based on t-statistic, lagpval=0.1, maxlag=15) 3: MacKinnon (1996) one-sided p-values.	

This table presents the ADF test results of the ALASN, NYSE AMEX, and OTCM ADR indexes.

ADF results show that all series are stationary at level as all critical values are negative and the p.values are less than 0.05. For that reason, subsequent processes will include; Autoregressive Moving Average (ARMA) modelling rather than Autoregressive Integrated Moving Average (ARIMA) modelling.
The EGARCH-M model and ARCH LM test results of the series are shown in the table below. When the model was constructed, GARCH(1,1) model was used with reference to Hansen and Lunde's 2001 study.

Table 10: EGARCH-M and ARCH LM tests

EURONEXT				NYSE AMEX			
	Parameters	Critical values	Prob.		Parameters	Critical values	Prob.
α0	-8.763	-3.332	0.0009***	α0	-1.035	-2.195	0.0282**
α1	0.3607	2.293	0.0218**	α1	0.0105	0.1297	0.8969
γ	-0.3200	-2.490	0.0128**	γ	-0.1993	-2.841	0.045***
β1	-0.0241	-0.0078	0.9381	β1	0.8715	14.990	0.0000***
Significance: ***0.01 ** 0.05 *0.1				Significance: ***0.01 ** 0.05 *0.1			
ARCH-LM(1)				ARCH-LM(1)			
F-static	0.0608	Prob. F(1,257)	0.8054	F-static	1.114	Prob. F(1,248)	0.2922
Obs*R-SQUARE	0.0613	Prob. Chi.Square(1)	0.8045	Obs*R-SQUARE	1.118	Prob. Chi.Square(1)	0.2903
H0: Model does not have ARCH effect				H0: Model does not have ARCH effect			
OTCM ADR							
		Parameters		Critical values		Prob.	
α0		-0.6463		-2.052		0.0402**	
α1		-0.0819		-2.144		0.032**	
γ		-0.2630		-3.999		0.0001***	
β1		0.9148		23.128		0.0000***	
Significance: ***0.01 ** 0.05 *0.1							
ARCH-LM(1)							
F-static		1.835		Prob. F(1,248)		0.1768	
Obs*R-SQUARE		1.836		Prob. Chi.Square(1)		0.1754	
HO: Model does not have ARCH effect							

This table presents the EGARCH-M and ARCH LM test results of the ALASN, NYSE AMEX, and OTCM ADR indexes.

From the EGARCH-M modelling results, no ARCH effect was observed. However, high volatility has been observed in some periods but the existence of permanent effects has not been observed in the long term.

All γ coefficients in the models are significant and negative. In that case, we can say that the effects of positive and negative shocks on volatility are asymmetric and there is the leverage effect. Negative shocks cause more volatility than positive shocks.

Conclusions

The U.S. as the privileged partner and the oldest ally of Europe for centuries, our focus in this research was to compare the state of Euronext all share index (which is the biggest international unregulated stock Market on continental Europe designed for SMEs) with its U.S. counterparts (NYSE AMEX Composite Index and OTCM ADR Index). To conduct our analysis, it was essential to identify the stock markets specially designed for SMEs in the two sides of the Atlantic in order to highlight the listing conditions they should comply with before an initial public offering (IPO).

The empirical results revealed that the Euronext all share indexes prices reflected the better result of the European unregulated market compared to its U.S. counterparts; moreover, according to the annual report of European SMEs 2014/2015, EU has a larger number of SMEs (more than 22 million) and post a higher level of SMEs employment more than U.S (the number of SMEs per Million GDP: EU = 1,65 and U.S = 1,5). However, after China, US is the second more attractive market for SMEs with a GDP per capital of $51 749 U.S (UNESCO 2014; OCDE 2015).

Our theoretical study has displayed the existence of a various unregulated stock market in Europe and the U.S. with diversified listing conditions, but much more lightened compared to principal regulated stock markets. However, going public decision is presented and analysed as the result of a cost-benefit comparison. SMEs keen interest in the stock market in recent years results from the combination of a set of factors including the IPO conditions, specificity and types of stock markets. With regard to all the advantages of an IPO as a tool to strengthen enterprises financial position stock market is still not a privileged source of financing for SMEs.

Arguably, as the backbone of the economy, SMEs IPO could improve if policymakers could pay more attention to SMEs, in establishing policies and accompanying measures susceptible to facilitate SMEs access to funds for their efficient growth, and thereby indirectly provide employment and undoubtedly enhance a sustained economic growth and welfare; prepare clear guideline to protect and foster fair competition. SMEs access to finance could also improve if decision makers in SMEs could separate management from ownership; lock off family succession and control and hire professional personnel to lead enterprises (Al. Barrak A. M. 2005).

The non-inclusion of all the unregulated stock markets indexes prices of the two areas coupled with limited duration of time is a fundamental limitation for this study. However, this study opted for 2013 as a starting point due to our desire to eliminate the 2008 global financial crisis effects. The result could also have been influenced by the poor performance of the U.S. unregulated market indexes price after the recovery from the subprime crisis. For an overall comparison of the two markets, this study can be extended to the main listing stock markets.

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