Momentum is Higher Than We Think

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Abstract

This paper evaluates Momentum on international markets based on data from Thompson Datastream (TDS). Using a complete filtered and corrected daily database from 52 International markets, and more than 50.000 common stocks, from TDS, we re-examine previous empirical work on International Momentum and document consistently higher momentum returns for the majority of markets and regions of our sample. We find evidence that data outliers create a "Pseudo-Reversal effect" in international Winner minus Loser profits, reflecting in the overestimation of premiums of loser portfolios and the underestimation of the profits of the momentum strategies. Moreover, we revise International Momentum premiums from 1964 to 2010, for all markets and regions of our sample and document that momentum continues to be strong in the majority of individual markets and all in regions except Japan.

JEL Classification : G12, G15, C89

1 Introduction

Since the Introduction of the capital asset pricing model (CAPM) by Sharpe(1964), Lintner(1965) and Black (1972) , empirical asset pricing has drawn considerable academic attention , where the majority of the papers, published in the top financial journals, are reffered to the understanding and modelling of stock market's returns. The early CAPM-ATP theoretical frameworks[1] were soon challenged by empirical evidence concerning the abnormal returns of attribute based portfolios[2]. Following the introduction of the Fama and French multifactor model (1992,1993), which exposed the multidimensional nature of priced risk, there was an exponential growth of the studies on the cross section of expected stock returns, the asset pricing anomalies, the pricing risk factors and the predictability of stock returns[3].

Among all documented asset pricing anomalies, momentum stands in the center of debate over the last 15 years, where many researches have sought to understand and explain this phenomenon. Momentum is the continuation effect in US stock returns documented by Jegadeesh and Titman (1993,2001). In fact short term past winners, that is stocks with a high performance during the last 3 to 12 months, tend to perform well over intermediate horizons, that is the following 3 to 12 months. On the contrary, short term past losers tend to be short term future losers as well. A strategy of buying the winners and sell short the losers, yields an average monthly 1,2% premium, that is Winners outperform loosers on average by more than 1% per month, during the period 1965 to 1998. The facts that momentum defies even the weak form market efficiency hypothesis, by implying economically exploitable trading opportunities, as long as that it consists of the only documented anomaly, which Fama and French 3 factor model fails to capture (Fama,French,1996), reinforced further research on the topic. Momentum was also documented to be present in the International stock markets, in Europe and Emerging markets (Rouwenhorst, 1998,1999), international markets and regions (Griffin,Ji and Martin, 2003) and Asia except Japan (Chui, Titman and Wei, 2000). There exists an ongoing debate on whether momentum is proxying for a risk factor or a time varying risk premium (Liew and Vassallou,2000; Carhart,1997;Fama and French,2010;Chordia and Shivakumar,2002) or is a market inefficiency caused by investors behaviour (Daniel, Hirshleifer, and Subrahmanyam, 1998; Barberis,Shleifer and Vishny,1998; Hong ans Stein,1999; Chui,Titman and Wei,2010).

[1] Sharpe (1964),Lintner(1965), Mossin(1966), Black(1972), Metron(1973) and Ross(1976).

[2] Portfolios formed based on stocks with a given ranking on characteristics-attributes such as Size(Banz-1981, Reingunum-1981), Value (Basu, 1977) , momentum(Jagadeesh and Titman, 1993) and Reversal (De Bondt and Thaler, 1985) , just to mention the most referenced.

[3] Scwert (2003) and Subrahmanyam (2009) provide extented overviews of the underlying asset pricing litterature.

USA stock markets (AMEX, NASDAQ and NYSE), constituing for more than 35% of the global market capitalisation have been established as the primary subject of financial research. A necessary condition for conducting valid asset pricing research is the availability of high quality, accurate financial data. Moreover, economic inferences rely on the statistical significance of econometric tequniques and motivations, which require the use of extent datasets- panel data, covering a long historical period and a broad number of securities. The most common source ,maintained for academic research on US equity markets is the Chicago's Center for Research in Security Prices (CRSP), which meets both criteria by offering price related data for all equities traded in the US stock markets and with more than 80 years of coverage for daily and monthly series[4]. The trivial mapping of CRSP daily/monthly series with the corresponding security's accounting fundamental data from Compustat (Compustat/CRSP Merged Database) established CRSP/Compustat as the basic, the most accurate and complete research tool among financial academic and researching community. Until the late 90's USA stock markets had served as the sole ground territory of financial research, reinforced by the practice of the highest ranked financial journals to publish,more likely, USA market-oriented studies, using CRSP/Compustat data.

For the case of International markets, although many databases were used in the studies referenced above[5], the only database comparable to CRSP, is Thomson Datastream (TDS)/ Worldscope. TDS/Worldscope is the broadest financial database covering more than 165.000 securities in 175 countries and 60 global markets , with more than 30 years of coverage and ten thousand datatypes available for each security[6]. TDS maintains also, considerable data for bonds, derivatives (options, futures,warrants,unit trusts), commodities, economics, exchange and interest rates. It is well-Known that the quality of TDS data is not as high as CRSP. Ince and Porter (2006) compare individual US equity return data from CRSP and TDS, and document important issues of coverage, classification and return data accuracy. They illustrate the impact of their filters, by comparing marketwide portfolios among raw and screened data for US and 4 European countries. Schmidt et al (2011) provide an extention, by expanding Ince and Porter filters and by replicating the price based value and size risk factors of Fama and French (1993) for the US and all European OECD markets. This paper, adds to previous studies by identifying further TDS return data problems and biases, as long as by providing a complete guide for the classification of TDS equities for 62 markets internationally. Moreover, we avoid the use of TDS built in market lists, which are inherent to a series of biases, and we apply the screening procedure on daily return data, mailnly due to the fact that some biases, such as extreme illiquidity, cannot be identified based on the monthly tapes. Based on this extent set of inconsistencies, we qualitatively built an adequate and realistic screening procedure,

[4] CRSP Stock File monthly Data basedates are NYSE: 1925, AMEX: 1962 and NASDAQ : 1972.

[5] Rouwenhosts (1998,1999) uses ARCAS-Wessels Roll Ross and IFC emerging markets database respectively, Griffin et al (2003) uses TDS and Chui, Titman and Wei(2000) use PACAP and TDS.

[6] DTS Equities base date is 1964 for UK and 1972 for US, Japan, Canada and the biggest European and International Stock Markets.

effectively applicable in all raw daily TDS data, that results in a screened and corrected dataset for more that 50.000 common stocks from 62 international markets.

This paper contributes to international Momentum litterature by revisiting global momentum evidence, based on our complete screened and corrected international dataset. In a first step we reexamine the most widely referenced papers of International momentum litterature and we, further,revise momentum evidence for 52 markets of our sample[7] for the period, from December 1964 to January 2010. We document that data outliers, ie. incomplete filtering, creates a "pseudo reversal" effect in international Momentum returns, that consistently reflects to the overestimation of the premiums of Loser portfolios profits and the underestimation of the profits of momentum strategies. We illustrating the "pseudo-reversal" effect by comparing regional momentum premiums, as computed by using our filtering procedure, against raw TDS data, as long as a dataset based on the filters proposed by Ince and Porter(2006).

The rest of the paper is organized as follows. In Section 2 we describe the data and the filtering procedure used in this study. In Section 3 we examine previous empirical work on International Momentum. In Section 4 we revise momentum evidence from 52 markets internationally for a 46 year period, from 1964 to 2010. Section 5 concludes with a summary.

2 Data

We use price, return, volume, dividend and reference data from Thompson Datastream International and Worldscope [8]. In order to avoid several instances of biases, we do not use the TDS/Worldscope built-in lists, but we rather use Datastream Navigator[9] to manually locate all available equities, active, suspended and dead[10], listed on the stock exchanges of 62 International Markets. Our initial raw sample covers 95.797 stocks from 32 European (Austria, Belgium,Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Porugal, Spain, Malta,Slovenia, Slovakia,Estonia, Bulgaria, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, UK, Sweden, Switzerland, Norway, Denmark, Turkey, Russian Federation), 9 North , Central and South American (USA, Canada, Mexico, Argentina, Brazil, Chile, Peru, Colombia, Venezuela), 16 Oceanian and

[7] For 10 out of the initial 62 markets of our sample, we do not have suffiecient data to form momentum portfolios.

[8] TDS time series (P,P#S,VO,RI,MV,DDE) and static reference datatypes (MNEM DSDC, EXMNEM, TYPE, CURRENCY, ESTAT, GEOGN, NAME, ENAME, ECNAME, CUSIP and MAJOR). Appendix, provides detailed descriptions and definitions,as provided by Datastream Extranet, for all variables used in this study.

[9] Datastream Navigator, is the main interface tool to navigate in TDS universe.

[10] A stock is referred as dead, when it cease trading on a stock exchange, that is when is delisted. The inclusion of dead stocks, helps in avoiding survivorship bias.

Asian (Australia, China, Hong Kong, Japan, Indonesia, Malaysia, New Zealand, Phillipines, Pakistan, Singapore, South Korea, Taiwan, Thailand, India, Israel, Sri Lanka) and 5 African stock markets (Egypt, South Africa, Bangladesh, Zimbabwe, Morroco). The sample period,for each market, is from its TDS basedate to 1^{st} January 2010. For all markets, we select stocks mainly from the major stock exchanges, which are defined as those with the majority of the domestic listings. We folllow the rule of excluding local exchanges on which less than 5% of the total number of domestic stocks are traded[11]. Based on this criterion , most countries in the sample have a single representative major exchange, except China (Shanghai and Shenzen stock exchanges), Germany (Frankfurt and XETRA[12]), Japan (Osaka and Tokyo Stock Exchange), USA (Amex,Nyse and NASDAQ), Poland (Warsaw and WarsawContinious Stock Exchanges), Spain (Madrid and Madrid-SIBE), Canada (Toronto,Alberta (Historical), Montreal and TSX Ventures stock exchanges), Malaysia (Kuala Lumpur and MESDAQ stock exchanges), South Korea (Korean stock exchange and KOSDAQ), India (Bombay and National India stock exhanges) , Colombia (Exchanges united in Bolsa De Valores De Colombia) and Russian Federation (Moscow, Moscow Interbank currency Exchange and Russian Trading System).

We further control against all identified TDS data inconsistencies and errors based on a series of static and dynamic filters[13]. Table 1 reports all of our filters, incorporating all previous findings concerning TDS biases. For each filter, its mathematical definition is included, where necessary.

Static filters are used in order to address for several biases such as currency risk, double counting and cross listing We exclude all stocks that trade in foreign currency,that is all stocks with currency indicator[14] other that the home currency of the underlying stock exchange. We remove all foreign stocks, that is stocks of firms incorporated outside the underlying market[15], that are not primarily listed in the underlying stock exchange. Following common asset pricing practise, we restrict our analysis to common stocks , excluding all types of non common shares refered as equities, such as shares with special futures,preferred stock, depository receipts, certificates, duplicates,warrants and rights issues. Moreover, we exclude funds, unit trusts and other "firms" for which the underlying asset is not typical of that underlying common equity. Finally we exclude from sample all

[11] Sole exception of the Rule stands Thailand where both SET (Bangkok untill late 70's and Securities exchange of Thailand-SET- onwards, TDS Code : BKK) and Thailand Foreign Exchange (TDS Code : BKF) meet criteria but the later is excluded as it mainly lists foreign stocks , not primarily listed in Thailand.

[12] XETRA was initiated at 1991, as an electronic trading platform and was mainly containing duplicates, especially of German Domestic Stocks. In order to avoid any instance of including cross listings we do not merge the german exchange listings but rather present all results for Germany for both cases of Frankfurt Stock Exchange and XETRA.

[13] Online Appendix, "Filtering Thomson Datastream for International Asset Pricing Research", provides a detailed description of all identified TDS biases and data problems.

[14] The currency indicator refers to the TDS static datatype PCUR.

[15] Home country of the companies is refered to GEOGN static Datatype.

Table 1
Static and Dynamic Filters
This Table lists all the filters we applied in raw Thompson Datastream daily database. List contains previous research and filters proposed by Ince and Porter,2006. Type refers to whether we exclude stocks based on static reference data, i.e. static filters or dynamically exclude observations across individual stock series ,i.e. dynamic filters.

Filter		Proposed by	Type
F01	**Remove invalid zero return records for dead stocks** Trailing invalid zero return observations after delisting.	Ince and Porter (2006)	Time Series
F02	Daily **Liquidity filter** Set as missing any zero return observation corresponding to a zero or missing volume.	Landis and Skouras	Time Series
F03	Monthly **Liquidity filter** Every month, exclude all stocks with a sum of zero and missing returns greater than 10 working days (2 weeks).[1]	Landis and Skouras	Time Series
F04	**Lower Stock volatility bounds** Exclude stocks with negligible variation, defined as daily return std $<10^{-6}$, during entire sample period.	Landis and Skouras	Time Series
F05	**Upper Stock volatility bounds** Exclude excessively volatile stocks, with daily return std(x)>15%.	Landis and Skouras	Time Series
F06	**Tiny stocks** Exclude "tiny or penny stocks" with a price lower than 1 unit of domestic currency.	Ince and Porter (2006)	Time Series
F07	**Daily return outliers** if $(1 + R_t)(1 + R_{t+1})$-1 <50% and R_t or R_{t+1} >100%. then $R_t = R_{t+1} = N/A$	Landis and Skouras	Time Series
F08	**Monthly Return Outliers** if $R_t > 300\%$ and R_{t+1} <-70% then $R_t = R_{t+1} = N/A$.	Ince and Porter (2006)	Time Series
F09	**Exclude non actual trading days** Exclude all days with valid data for less than 5% of the total number of active stocks.	Landis and Skouras	Time Series
F10	**Exclude months with a small share of valid stocks** valid stocks < 0.5 % of total sample stocks	Landis and Skouras	Time Series
F11	**Use daily series to construct monthly tapes** Construct monthly returns based on the screened daily tapes, rather than monthly requested series.	Landis and Skouras	Time Series
F12	**Correct for Currencies in EMU markets** Convert pre Euro-effective date data to Euro, correcting for wrongly reported currencies in series.	Landis and Skouras	Static - TS
F13	**Exclude non-common equities** Exclude all types of stocks, other than common.	Ince and Porter (2006) Expanded by L&S	Static
F14	**Exclude multiple types of common stock**	Landis and Skouras	Static
F15	**Exclude foreign stocks, primary listed on foreign stock exchanges**	Landis and Skouras	Static
F16	**Exclude stocks trading in foreign currency**	Ince and Porter (2006)	Static
F17	**Exclude stocks traded in foreign stock exchanges**	Landis and Skouras	Static
F18	**Exclude stocks, marked by TDS, as of Limited Data**	Landis and Skouras	Static

[1] An exception stands for the cases, such as Vienna and Sofia stock exchanges where daily data are updated monthy, and so they are excluded only from daily tapes.

stocks for which adjusted time series are unavailable[16],as long as stocks, referred as of limited data[17].

We further apply a series of dynamical filters to raw daily series in order to control for the presence of outliers and erroneous observations in our sample. Outliers are identified in terms of extreme daily or monthly illiquidity, stock volatility, outlying stock returns and the presence of the so called "penny" stocks. Extreme daily or monthly illiquidity, as proxied by zero daily stock returns or monthly returns calculated over a month with a high proportion of zero returns, respectively, should be controled, mainly due to issues concerning the stability of prices, the "bid-ask bounce" effect and the stocks vulnerability to manipulation. All the above effects reflect in spurious price behaviour and would induce biases in case they are not excluded from samples. Moreover, orders on illiquid stocks could have a big impact on its price and so a bias is introduced by implying that an investor could have traded on them during sample period without influencing its prices. This is translated to an upward/downward bias in the returns of strategies and attribute based portfolios whether we focusing on bear/bull market periods. Volatility outliers, which further identify stocks with bad quality data, can be adressed, by setting reasonable levels of upper and lower bounds to the standard deviation of the individual stock returns. In addition, extreme return outliers, that is extreme daily or monthly return observations[18] which tend to reverse within a period, are attributed to typos or incorrect capital changes, such as stock splits. The decimalization practice of rounding prices to the nearest penny can cause an upward trend to returns of stocks with a low level of market value and a relatively small price. So, it is common practice, which also holds for the users of CRSP, to exclude these stocks in order to avoid inducing such biases to sample returns[19]. Finally, we exclude outlying stock exchange days, that is trading days with a small coverage, less than 5%, of valid returns relative to the total number of the currenctly active stocks of the underlying market. Moreover, we exclude months with a total number of listed stocks smaller than the 0.5 % of the total number of stocks for any given stock exchange market[20].

Monthly returns are calculated, at a second stage, based on the daily screened series. We use the actual end of month days to cut the daily tapes after controlling for the actual exchange market holidays for all the markets, during the sample period. Finally, a special handling is used for the cases, where daily historical data are, in fact, updated monthly by

[16] adjusted for capital actions/changes

[17] Stocks are classified by TDS as of limited data via name abbreviations, as detailed in online appendix.

[18] We set both daily or monthly R_t, R_{t+1} as missing if R_t or R_{t+1} is greater than 100% or 300% respectively and $(1+R_t)(1+R_{t+1})-1 \leq 50\%$.

[19] We adopt a similar restriction by excluding all observations that correspond to an unadjusted price, smaller than 1 unit of domestic currency.

[20] This filter affiliates the bias that exists, when estimations for several periods are based on a relatively low number of securities compared to the rest of the sample period, such as in the cases of Philippines and Sweden, where for the 108 and 129 earliest months of the samples, only 4 and 1 stock respectively are covered.

TDS for several periods[21]. Although, these observations are excluded in daily tapes, we do not exclude months but rather use the monthly updated series to compute monthly returns after excluding the zero return observations that correspond to a zero or missing end of month trading volume. At this point we should highlight the fact that screening TDS using daily frequency data, we can effectively control for inconsistencies in the monthly returns, which would be extremely difficult, or even imposible in many of the above cases, to be identified by focusing solely on monthly tapes[22].

Table 2 presents descriptive statistics for our final screened and corrected dataset after applying the filters of Table 1. Monthly returns are the averages of the cross sectional averages of monthly stock returns. Stock std is the average of the cross sectional averages of the standard deviation of monthly returns. Size is the time series average of the median market capitalization of all stocks and is expressed in millions of national currency. Monthly value and equally weighted market returns are the returns of the value and equally weighted country portfolios, containing all stocks for each market. To construct value and equal weights we rank stocks based on the previous month market capitalizations. All values, reported on Table3, except Number of stocks and size are in percent terms. Screening procedure dramatically decreases the total number of stocks , almost by half in all regions, resulting in a total of 57.929 common stocks internationally. Filtering procedure has a far more larger impact on equally weighted returns, revealing that most of the inconsistencies are concentrated in small stocks[23]. On average the screened sample equally weighted market average returns are decreased by 0.50% compared to an increase of 0.11% in the value weighted market returns[24]. Same implications derive also from the cross sectional averages of the individual stock average returns and standard deviations. Average monthly stock returns decreases on average around 0.12% and monthly standard deviation by 10.2%. Most importantly, the average median market value increases[25], on average by 400%, in the screened sample, which is a strong indication that small and illiquid stocks suffer the most problems in all 62 markets.

[21] In cases such as Vienna stock exchange.

[22] Online appendix, provides links between screens and the TDS data errors- inconsistencies, they control.

[23] Online appendix Table 1 presents the relevant descriptive statistics for the raw samples.

[24] Markets with obvious extreme outliers,that reflects to huge equally weighted market average returns, such as Russian Federation, Zimbabwe and Brazil, are excluded in the coputation of these average statistics.

[25] The smallest increase, 8%, belongs to China and the highest, 22000%, to Bulgaria. This result is due to the concetration of a high number of tiny stocks to raw sample, which are filtered in final sample.

Table 2
Screened Sample Descriptive Data
Table shows descriptive statistics for the screened and corrected data of our 62 International Markets database.The Start date for each market appears in the yyyymmdd form and the end sample date for all markets is the 31 December 2009. Descriptive statistics appear in national currency.Stock Monthly returns are the averages of the cross sectional averages of monthly stock returns. Stock std is the average of the cross sectional averages of the standard deviation of monthly returns. Size is the time series average of the median market capitalization of all stocks and is expressed in millions of national currency. Monthly value and equally weighted market returns are the returns of the value and equally weighted country portfolios, containing all stocks for each market. To construct value and equal weights we rank stocks based on the previous month market capitalizations. Momentum is the monthlly time series average of the median momentum performance for all stocks of each market and is measured, each month, as the continiously compounded return during the previous past six months, skipping the most recent month. All values except Number of stocks and size are in percent terms.

Market	Screened Series Start Date	Total Number of Stocks	Monthy Value w. Market Returns (%)	Monthy Value w. Market std (%)	Monthly Equally w. Market Returns (%)	Monthly Equally w. Market std (%)	Size (Local Mills.)	Stock Monthly Returns (%)	Stock std (%)
Panel A : Europe		18543							
Austria	19730131	215	0.88	5.74	0.87	4.95	129.78	0.82	10.66
Belgium	19730131	350	0.81	4.70	0.84	3.95	87.30	0.71	9.23
Finland	19870131	243	1.23	8.35	1.17	5.86	186.18	1.60	12.27
France	19730131	1791	1.07	5.76	1.20	5.41	130.47	1.27	13.17
Germany	19730131	1807	0.71	5.06	0.67	4.71	188.89	0.14	15.22
Germany - XETRA	19910731	1096	0.72	5.91	0.61	6.57	1746.37	-0.47	15.99
Greece	19880131	431	1.48	9.99	1.82	10.47	67.40	1.16	18.24
Ireland	19650630	119	0.48	6.94	0.70	7.05	305.31	1.29	11.75
Italy	19730131	555	0.97	6.44	1.04	6.06	187.86	0.30	10.80
Luxembourg	19890531	41	0.97	9.05	1.37	7.42	430.46	3.20	10.61
Netherlands	19730131	265	1.04	5.16	1.08	4.80	177.36	0.68	11.56
Portugal	19880131	149	0.82	5.38	0.89	5.11	222.42	0.79	10.97
Spain	19860131	303	0.95	5.87	0.93	5.94	497.29	1.21	11.11
Denmark	19730131	409	0.90	4.83	1.10	4.55	604.13	1.14	11.14
Norway	19730228	602	1.48	7.11	1.57	6.75	644.28	1.43	14.22
Russian Federation	19980331	173	3.19	11.90	3.49	11.15	30660.02	4.74	19.69
Sweden	19820131	1282	1.47	6.86	1.52	6.65	697.38	1.12	14.32
Switzerland	19730131	627	0.72	4.45	0.78	4.31	299.35	0.89	10.01
Turkey	19880131	388	5.29	17.48	5.48	16.82	55.92	2.95	19.35
United Kingdom	19650131	6053	1.03	5.19	1.18	5.18	45.58	1.61	14.97
Cyprus	19921231	105	1.84	13.22	1.74	11.39	103.63	-0.77	18.54
Malta	20000131	13	0.59	6.17	0.75	5.38	321.86	1.89	6.97
Slovenia	19960131	112	1.13	6.65	0.85	5.45	103.66	1.48	8.44
Slovakia	19980831	40	3.22	11.36	3.36	9.19	181.85	12.37	10.30
Bulgaria	19980430	177	1.59	10.24	2.54	10.71	40.04	1.12	12.18
Czech Republic	19930630	313	1.03	8.63	1.51	7.52	14247.54	1.54	19.23
Estonia	19960831	26	1.86	9.68	2.11	8.39	87.86	0.54	14.26
Hungary	19910131	74	2.21	10.16	1.70	8.78	11322.17	2.01	15.27
Latvia	19971130	24	1.35	9.99	1.35	10.49	77.21	3.89	8.26
Lithuania	19980430	61	0.68	8.10	1.67	7.50	163.73	3.07	15.47
Poland	19910430	643	2.12	13.36	2.53	13.89	108.03	0.67	14.41
Romania	19951130	56	2.35	11.63	2.34	8.45	164.06	1.20	13.59

Table 2
Continued

Market	Screened Series Start Date	Total Number of Stocks	Monthy Value w. Market Returns (%)	Monthy Value w. Market std (%)	Monthly Equally w. Market Returns (%)	Monthly Equally w. Market std (%)	Size (Local Mills.)	Stock Monthly Returns (%)	Stock std (%)
Panel B : Americas		19575							
USA	19730131	15180	0.91	4.57	1.36	5.32	163.55	1.46	14.41
Canada	19730131	5726	0.87	4.61	1.16	4.93	74.49	1.09	16.63
Mexico	19871031	389	2.36	9.15	2.53	8.17	5021.35	3.30	12.73
Argentina	19800131	140	4.29	22.49	4.71	23.48	347.01	5.60	18.77
Brazil	19930131	402	3.04	11.23	3.52	11.06	982.38	3.55	15.38
Chile	19890731	289	2.00	7.44	2.23	6.16	147919.81	3.27	11.02
Peru	19910131	258	1.71	10.96	2.69	10.32	492.42	3.71	13.84
Colombia	19920131	158	2.36	7.76	2.26	7.46	977652.98	4.09	9.16
Venezuela	19900131	33	3.79	14.83	4.19	15.39	277.24	4.59	16.59
Panel C : Australasia		18262							
Australia	19730131	1906	1.06	5.02	1.23	4.74	214.23	1.07	12.56
China	19911031	1759	1.76	13.65	2.25	14.14	1913.75	1.82	15.19
Hong Kong	19730131	1196	1.42	8.40	1.70	8.57	1221.82	1.54	16.74
Japan	19730131	3506	0.46	5.03	0.89	5.57	39482.60	0.47	13.65
Idonesia	19900430	476	1.45	9.85	2.28	11.02	392889.05	3.40	21.31
Malaysia	19830731	1031	1.10	7.37	1.46	9.05	325.14	0.93	14.89
New Zealand	19860131	250	0.81	5.81	1.10	5.83	268.61	1.17	9.03
Pakistan	19910131	364	2.22	10.18	2.53	8.95	1553.09	5.45	17.86
Philippines	19870930	261	1.58	8.70	2.09	8.86	5231.85	2.50	19.18
Singapore	19730131	416	0.86	6.67	1.27	6.96	590.13	1.23	10.93
South Korea	19840731	2563	1.40	9.00	1.86	10.10	35708.81	1.28	21.43
Taiwan	19870930	940	0.95	10.00	1.38	10.45	7223.14	1.30	15.55
Thailand	19870131	771	1.30	10.06	1.93	9.93	1638.69	1.22	15.63
India	19900131	4640	2.04	9.97	2.86	11.02	656.93	3.59	23.73
Israel	19860131	904	1.37	7.00	1.58	7.27	117.75	1.52	17.36
Sri Lanka	19870630	279	1.75	8.65	2.07	8.52	484.02	3.98	17.46
Panel D : Africa		1549							
Egypt	19950930	228	1.74	9.41	2.12	9.26	544.98	3.13	18.81
South Africa	19730131	953	1.39	6.42	1.68	6.34	881.10	1.92	13.60
Bangladesh	19920131	313	2.46	12.47	2.66	10.41	242.13	3.85	17.89
Zimbabwe	20010831	31	29.18	45.06	29.81	47.15	2556.32	64.12	95.77
Morocco	19930731	124	1.29	4.82	1.29	4.50	1284.67	1.26	9.27

3 International Momentum Strategies : Reexamine prior studies

Data inconsistencies may intoduce biases to financial results, especially in empirical measures which are directly derived from raw pricing data. Common momentum measures are primarily based on historical closing prices of equities, so inconsisencies are expeted to have a larger impact relatively to company accounts-based measures. In this sectio, we use our unique international database to reexamine momentum results in two of the most important and widely referenced, studies of international momentum literature. That is Griffin , Ji and Martin (2003) that uses Thompson Datastream database, as long as Rouwenhorst (1998), that is based on a third partie database[26]. For each case, we replicate all techniques and motivations of underlying study, and we present results in similar way, for tables to be directly comparable. Throughout this section, we document that problematic and innacurate data are concentrating mostly on the extreme portfolios, especially on losers, inducing a "pseudo" reversal effect to momentum profits. Thus, our advanced filtering procedure result to higher momentum profits, mostly affected by a large reduce in loser portfolio profits.

The most common methodology of measuring momentum profits[27] is the composite, buy and hold, portfolios of Jegadeesh and Titman (1993). Buy and hold momentum strategy consists of a ranking period, over which past performance of stocks is evaluated and a holding period over which we hold the winners and sell short the loosers. At the end of each month, all stocks with available return history during the ranking period, are ranked based on their past months cumulative return and assigned to one of the relative strength portfolios. These portfolios are equally weighted in formation, and are held during investing period without beeing rebalanced. An exception stands, in cases where stocks are delisted during holding period, where the liquidating proceeds are reinvested in the remaining stocks of the decile portfolio. Also, we follow the common practise of skipping a month between performance ranking and portfolio formation, in order to mitigate for the so-called bid-ask bounce, which attenuates continuation effects. Moreover, to increase the power of tests, overlapping momentum portfolios are constructed, such as each month, the return of each underlying composite portfolio to be computed as the average monthly return of all the currently running vintages[28].Momentum strategy consists of the average winner minus loser (WML) profits (top minus bottom ranked portfolio).The above methodology is adopted in both underlying studies, which are replicated during this section, as long as to our momentum . The exact specifications, concerning the holding, investing periods and the fractile, upon which portfolios are constructed, will be analysed separately for each case.

[26] ARCAS-Wessels Roll Ross provided the data for this study.

[27] Both Griffin,Ji and Martin (2003) and Rouwenhorst (1998) adopts this methodology.

[28] The number of the currently active vintages, each month, is equal to the length of the holding period, that is the number of months stocks are held to portfolios without rebalancing.

3.1 Griffin, Ji and Martin (2003)

Griffin , Ji and Martin (2003) examine, among others, momentum effect, within and between international markets and document large and statistically significant momentum profits around the World. Their sample contains 40 international markets, where data for the US Market[29] are obtained from CRSP while data for the rest of the markets are from Thompson Datastream (TDS)[30]. Following GJM (2003), Table 3[31], reports the average momentum profits for all markets and all regions of the sample. Panel A reports the average momentum (winner minus loser) profits for each country and region in local currency. Moreover sample starting, end dates and the number of firms, available at January 1990, are reported. for each country. Dates appear in yyyymm form. Also, for markets,with coverage beginning later that 1990, the number of stocks upon the first available month is reported. Momentum, buy and hold composite strategies focus on the top(Winner) and bottom (loser) 20% of stocks, that is stocks are sorted on quintiles, and use a six month ranking and investing period, with equal weights, by skipping a month between the periods. That is, for each month t, the portfolio held during the investment period, months t to t+5, is determined by performance over the ranking period t-7 to t-2. The only difference between Table 3 and the results of GJM(2003) is that we report USA momentum strategies by using our NYSE,AMEX DTS datasets. So results for USA are not directly comparable as our smaple period starts at December 1972, while CRSP monthly US data are from June 1926. Regional series are constructed as the equally weighted average of all countries in the region. Panel B reports results, where portfolio formation occurs directly after ranking period, without skipping a month, that is ranking period t-6 to t-1. Finally, following GJM (2003), as country market indices, we use the Datastream value-weighted market index, if available, otherwise we use the International Finance corporation (IFC) index. We expand Table 3 by including comparisons of our results relative to GJM (2003). Stocks change refers to the ratio of our total number of stocks for each market-region, to that of GJM. Also in the last 3 columns we measure the difference in the estimated profits of momentum strategies (WML), excess winner and excess loser portfolios. Focusing, on the change of stocks used, compared to GJM(2003), we use on average more than double stocks in each market and region. The largest difference in stocks, refers to the case of Asia, where we have 4 times more stocks for this region.

[29] Griffin, Ji and Martin (2003) use all common stocks listed in AMEX and NYSE stock exchanges.
[30] Griffin,Ji and Martin (2003) select countries for which at least 50 stocks are available.
[31] Table 3 replicates GJM (2003)'s Table 1 at pages 2519-2521.

Table 3
Momentum Profits by Country and Region
For each month, t, stocks in each country are ranked into quintile groups based on their performance over the 6 months t-7 to t-2. The momentum strategy buys the winner quintile and sells short the loser quintile, holding these positions for the 6 months, from t to t+5. The time series for each region is constructed as the monthly equally weighted average of all countries in the region. Panel A reports average momentum profits (WML) and returns in excess of the local market index separately for winners and losers. Begin dates are also shown. The dates are in the yymm form. The ending date for all countries is December 2000, except June 1999 for Peru and August 2000 for Argentina. Number of stocks is for the first portfolio available in or after January 1990. Stocks change is the ratio of our number of stocks to GJM (2003) number of stocks. In the last 3 columns we substract GJM (2003) corresponding estimations, in order to see relative differences. Panel B shows regional summary results using the period from t-6 to t-1 for ranking stocks.

				Momentum Profits		Returns VS Local Market				Difference with GJM (2003)		
Region / Country	**Begin**	**No. Stocks**	**Stocks Change**	**WML**	**t**	**Winner**	**t**	**Loser**	**t**	**WML**	**Winner**	**Loser**
Panel A : Ranking Period is t-7 to t-2												
Egypt	9705	121	2.24	1.22	1.21	1.25	1.18	0.03	0.03	0.98	1.97	0.98
South Africa	9009	453	2.00	1.22	1.63	0.57	1.47	-0.65	-1.00	-0.60	-1.20	-0.61
Africa	**9009**	**574**	**2.05**	**1.00**	**1.42**	**0.67**	**1.79**	**-0.33**	**-0.52**	**-0.63**	**-0.85**	**-0.21**
Argentina	9404	71	1.08	-0.11	-0.23	0.25	0.42	0.37	0.35	-1.11	0.10	1.22
Brazil	9408	179	2.06	-0.70	-0.43	0.61	0.99	1.31	0.83	-1.44	-1.29	0.14
Canada	7508	2063	2.45	0.70	2.54	0.51	2.19	-0.19	-0.67	0.18	-0.74	-0.92
Chile	9003	118	1.28	2.22	4.18	1.45	3.64	-0.77	-1.69	1.10	0.81	-0.29
Mexico	9205	146	1.97	0.85	1.39	0.14	0.39	-0.71	-1.23	-0.36	-0.21	0.14
Peru	9502	55	0.77	-1.21	-0.57	-1.41	-1.19	-0.20	-0.11	-1.24	-3.74	-2.50
Americas (Ex. USA)	**7508**	**2632**	**2.13**	**0.97**	**3.70**	**0.82**	**4.39**	**-0.15**	**-0.63**	**0.20**	**-0.31**	**-0.50**
Australia	7508	950	1.87	1.19	3.27	0.73	2.20	-0.46	-1.82	0.76	-0.76	-1.52
China	9406	1640	6.48	0.19	0.32	0.20	0.32	0.01	0.01	0.20	0.30	0.10
Hong Kong	8402	762	4.26	1.09	2.41	-0.01	-0.01	-1.09	-2.07	0.68	-0.26	-0.94
India	9009	3357	8.95	1.11	1.51	0.82	1.24	-0.29	-0.36	0.31	0.03	-0.27
Indonesia	9012	268	2.76	0.65	0.69	1.29	1.72	0.64	0.58	1.65	0.30	-1.35
Japan	7508	3245	1.71	0.02	0.08	0.38	1.76	0.36	1.13	0.00	0.29	0.29
Malaysia	8609	805	4.24	-0.03	-0.05	-0.06	-0.15	-0.03	-0.04	-0.21	-0.43	-0.22
New Zealand	8809	126	1.58	1.22	2.02	1.10	2.42	-0.11	-0.27	-0.11	-0.32	-0.19
Pakistan	9303	177	1.51	0.01	0.01	-0.04	-0.07	-0.05	-0.06	0.31	-0.46	-0.77

Table 3
Continued

				Momentum Profits		Returns VS Local Market				Difference with GJM (2003)		
Region / Country	**Begin**	**No. Stocks**	**Stocks**	**WML**	**t**	**Winner**	**t**	**Loser**	**t**	**WML**	**Winner**	**Loser**
			Change									
Phillipines	9306	169	2.68	0.44	0.46	-0.37	-0.67	-0.81	-0.97	-0.73	-1.80	-1.07
Singapore	8309	236	2.11	-0.15	-0.37	0.44	1.84	0.60	1.62	-0.25	0.17	0.43
South Korea	8710	2238	3.81	-0.48	-0.64	-0.03	-0.05	0.45	0.49	0.28	0.18	-0.09
Taiwan	8908	878	5.35	-0.01	-0.02	-0.48	-0.86	-0.47	-0.73	-0.02	0.11	0.13
Thailand	8709	621	4.01	0.36	0.47	0.53	0.92	0.17	0.20	0.19	-0.10	-0.29
Asia	**7508**	**15472**	**3.24**	**0.28**	**1.20**	**0.48**	**2.96**	**0.20**	**1.05**	**-0.04**	**-0.26**	**-0.22**
Asia (EX. Japan)	**7508**	**12227**	**4.24**	**0.41**	**1.62**	**0.43**	**2.37**	**0.02**	**0.07**	**0.01**	**-0.65**	**-0.66**
Austria	8902	162	3.18	0.52	1.36	0.30	1.26	-0.23	-0.67	-0.18	0.07	0.24
Belgium	7508	172	1.33	1.14	2.82	0.68	2.07	-0.46	-1.35	0.02	0.29	0.27
Denmark	8812	224	1.46	1.36	3.15	0.34	1.04	-1.02	-2.71	0.44	0.08	-0.36
Finland	9307	154	2.85	0.47	0.74	-1.04	-2.08	-1.51	-2.20	-0.03	0.15	0.18
France	7508	1083	1.90	1.05	3.95	0.93	4.74	-0.12	-0.48	0.26	0.36	0.10
Germany	7508	1070	2.13	1.01	4.06	0.46	2.44	-0.55	-2.53	0.32	0.29	-0.04
Greece	9002	391	6.31	1.25	1.85	0.65	0.86	-0.60	-0.80	-0.36	-0.81	-0.46
Ireland	9003	36										
Italy	7508	446	2.42	1.23	3.07	0.27	1.03	-0.96	-3.13	0.37	-0.16	-0.53
Netherlands	7508	237	1.20	1.07	3.47	0.70	3.01	-0.37	-1.27	-0.09	0.28	0.36
Norway	8206	341	3.88	1.32	2.73	0.92	2.70	-0.40	-0.87	0.21	0.04	-0.17
Portugal	9002	87	0.98	0.75	1.02	0.52	1.06	-0.23	-0.34	1.38	0.25	-1.13
Spain	8711	225	2.25	0.17	0.39	-0.17	-0.67	-0.34	-0.76	-0.15	-0.10	0.05
Sweden	8406	763	4.77	0.37	0.86	0.25	0.99	-0.13	-0.29	0.38	0.30	-0.08
Switzerland	7508	364	1.99	1.43	4.01	0.86	3.04	-0.57	-2.30	0.48	0.42	-0.06
Turkey	8904	310	4.31	-1.25	-0.93	-1.24	-1.10	0.01	0.00	0.25	-1.85	-2.10
UK	7508	2482	1.77	0.71	1.97	0.67	3.01	-0.05	-0.14	-0.32	-0.09	0.22
Europe	**7508**	**8511**	**2.10**	**0.95**	**6.08**	**0.57**	**5.60**	**-0.37**	**-2.72**	**0.18**	**0.12**	**-0.05**
USA	7301	6692	3.47	0.77	4.28	0.83	4.88	0.06	0.31	0.18	0.17	-0.01

Table 3
Continued

				Momentum Profits		Returns VS Local Market				Difference with GJM (2003)		
Region / Country	**Begin**	**No. Stocks**	**Stocks Change**	**WML**	**t**	**Winner**	**t**	**Loser**	**t**	**WML**	**Winner**	**Loser**
Developed (Ex. USA)	7508	15583	2.09	0.85	6.52	0.61	6.83	-0.25	-2.09	0.12	0.07	-0.07
Developed	7301	22275	2.37	0.77	5.30	0.66	7.20	-0.11	-0.73	0.26	0.01	-0.25
Emerging	8609	11606	4.01	0.39	1.29	0.23	1.28	-0.16	-0.51	0.12	-0.36	-0.48
World (Ex.USA)	7508	27189	2.63	0.76	5.99	0.58	7.20	-0.18	-1.58	0.11	-0.02	-0.13
World	7301	33881	2.76	0.69	4.83	0.64	7.43	-0.05	-0.35	0.20	-0.03	-0.24
Panel B : Ranking Period is t-6 to t-1												
Africa	9008	596	2.08	1.11	1.59	0.81	1.98	-0.30	-0.49	-0.31	-0.77	-0.46
Americas (Ex. USA)	7507	2763	2.24	0.96	3.68	0.87	4.60	-0.09	-0.39	0.46	-0.20	-0.66
Asia	7507	15709	3.29	0.22	0.91	0.51	3.18	0.29	1.45	0.09	-0.18	-0.26
Asia (EX. Japan)	7507	12434	4.33	0.43	1.69	0.52	2.90	0.08	0.35	0.23	-0.51	-0.75
Europe	7507	8775	2.16	0.86	5.42	0.55	5.46	-0.32	-2.26	0.16	0.12	-0.05
USA	7212	6807	3.53	0.58	3.15	0.77	4.53	0.18	0.87	0.27	0.24	-0.04
Developed (Ex. USA)	7507	16052	2.15	0.79	5.65	0.61	6.68	-0.18	-1.45	0.15	0.08	-0.06
Developed	7212	22859	2.44	0.69	4.41	0.66	7.04	-0.03	-0.19	0.40	0.10	-0.30
Emerging	8608	11791	4.08	0.38	1.26	0.25	1.29	-0.13	-0.42	0.39	-0.25	-0.64
World (Ex.USA)	7507	27843	2.69	0.68	5.07	0.58	6.93	-0.11	-0.91	0.15	0.01	-0.15
World	7212	34650	2.82	0.60	3.91	0.63	7.19	0.03	0.21	0.35	0.06	-0.29

Table 3 reveals significant differences in momentum premiums. We calculate a significant increase in WML average return in 22 out of the 40 international countries, where the highest differences occur for Egypt, Canada, Indonesia and Portugal, just to mention at least an example for each region. On the other hand, our etimated WML profits are significantly lower for 10 out of 40 countries. The highest deviation occurs to American (Ex. USA) markets where the average WML profits for Argentina, Brazil and Peru turns to negative. Moreover for 8 cases our results are insignificantly different from GJM(2003). Finally, our screening procedure leaves less than 50 stocks in Ireland, during the underlying period and so it is excluded from our tests. Interestingly, in the mafority of cases the increase in WML profits is attributed to large decreases in Loser portfolio payoffs.

Focusing on a regional level, we document an incerease in momentum profits of all regions, except Africa. In Americas (excluding USA) MWL profits increase by 25%, where both Winners and Losers returns are decreased by 30% and 60%, respectively. Same, in Asia we document a significant overestimation of both Losers and Winners, where Loser profits decrease from 0.60% to zero and winners fall from 1.08% to 0.43%,respctively. These changes leaves unaffected the WML profit, which is close to 0.40% per month. For Europe WML profits increase by 23%, which is attributed to an 27% increase in Winners profits and a 20% reduce to Losers.

Based on the overall results of Table 3, we document an "pseudo-Reversal effect" in the international momentum returns. That is the tendency of data outliers to be concentrated on the extreme momentum portfolios, resulting a consistent overestimation of Losers portfolio profits for all cases, which is translated to higher momentum profits. The impact in winners portfolio is not clear, as the estimated profits seem to be equally over or underestimated around international markets and regions.

The effect is more clear, by focusing on the aggregated results in the bottom of Panel A, where on average, for all cases we document, a significant decrease in excess Losers profits, resulting to a significant increase of momentum profits. On the other hand, on average the impact on Winners is not significant, except for the case of Emerging markets, for which the highest deviations, compare to GJM(2003), were documented. It is worthwhile to mention that our estimate of the momentum premium for Emerging markets, 0.39%, is exactly the same eith Rouwenhorst (1999), using data from IFC for the relevant period[32]. Finally, based on Panel B, in line with GJM (2003), we find that skipping a month between ranking of stocks and investing periods, increases the returns of momentum portfolios, for all regions. Moreover, the "pseudo-Reversal effect" is also significant for all underlying cases, except Africa.

Overall, based on both panels A and B, the "pseudo-Reversal effect" is strong for all cases, resulting in a consistent and significant overestimation of Losers profits by almost 0.6% per month. For devellopped markets the difference on Winners is not significant, while

[32] Rouwenhorst(1999) uses data from the Emerging markets datbase of IFC, for the period from January 1982 to April 1997, which strongly correlates with ours, that is July 1986 to December 2000.

a significant overestimation of 20% occurs for the Emerging markets winners portfolios. Overall, controlling for the "pseudo-reversal" effect increases WML profits by 25%. The only exception stands for Africa, where the mispricing, on average, on winners is greater than the mispricing of Losers. African region, though, contains only 2 countries and the results are biased towards South Africa.

3.2 Rouwenhorst (1998)

In a study widely referenced in momentum litterature,Rouwenhorst (1998), examines momentum profits using a sample of 2190 stocks from 12 European countries from 1978 through 1995[33]. He documents that momentum is present in all European individual markets as long as for an pan european diversified portfolio, where past medium term past Winners outperform past medium Term losers by more than 1% per cent per month. In this section we replicate Rouwenhorst results by using a much broader dataset, containing 4.410 common stocks from the underlying European countries. For all markets, we include a grater number of stocks, compared to Rouwenhorst(1998), except Belgium, for which we only have 47 stocks in the screened tapes[34].

Following Rowenhorst(1998), Table 4[35] reports the average monthly returns of buy and hold winner, loser and momentum pan-european diversified portfolios, for a series of ranking and holding periods. Each month, all European stocks of the sample, are ranked into deciles (10%) based on their J-month past performance, where the bottom 10% of the stocks is assigned to Loser portfolio and the high 10 % to the Winners. These portfolios are equally weighted and are held for the k subsequent months, without rebalancing. To be included in the analysis, a stock should have available data, for both ranking and investing periods.All returns are converted to german marks, using exchange rate information from Thompson Reuters. Panel A reports the case where investment period occurs directly after ranking period , while panel B to the case where we skip a month between the above periods. Panels C and D, reports the first differences for all our underlying estimates, with those in Rouwenhorst. Also in Panel A and B,t ratios for the average WML returns, as long as the number of stocks used in each case are reported.

Panels A and B, in line with the underlying study, show that momentum profirs are large and significant and for the majority of cases Winners outperform losers by more than 1% per month. The profit of a momentum strategy falls, at any given ranking period, when the investment period increases from 3 to 12 months. Also for the cases of a relatively short investing period, 3 or 6 months, momentum profits increase as we move from a 3 to 9 ranking period.

[33] Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and United Kingdom.

[34] Rouwenhorst (1998) uses 127 stocks from Belgium.

[35] Table 4, panels A and B, are directly comparable to Table 1 in Rouwenhorst (1998),pp.270.

Table 4
Returns of Relative strength Portfolios
At the end each month, all European stocks are ranked into deciles based on their past J-month performance. The 10% of the stocks with the highest performance are assigned to the Winers portfolio, while those with the lowest past performace, to the Loser portfolio. The portfolios are initially equally weighted and are held during the period t+k, that is the k subsequent months. The average return of each of the decile portfolios is computed as the average of the returns of the 6 simultaneously running vintages. WML is the return of a strategy, going each month, long on the Winners and short on Losers. Table reports the average values of the Buy and Hold momentum returns on these portfolios for the period 1980 to 1995. Panel A refers to the case where the portfolios are formed immediatly after ranking, while Panel B to the case when we skip a month between the ranking and the investing period. t statistics are also reported Panels C and D reports the deferences of our results with the corresponding results of Rowenhorst(1999), where for all our estimations, we substract the corresponding values of Rouwenhorst(1998) values. Returns for all stocks are converted to Deutsche marks, using the exchange rates from Reuters.

Ranking Period (J)	Portfolio	Panel A - Ranking t-j-1 to t-2 Holding Period (K) 3	6	9	12	Panel B - Ranking t-j to t-1 Holding Period (K) 3	6	9	12
3	Loser	0.0085	0.0082	0.0079	0.0076	0.0063	0.0066	0.0069	0.0079
	Winner	0.0205	0.0194	0.0205	0.0196	0.0197	0.0193	0.0200	0.0186
	WML	0.0120	0.0112	0.0126	0.0120	0.0134	0.0125	0.0131	0.0108
	(t-stat)	4.06	4.05	4.82	4.71	4.36	4.48	4.98	4.23
	# Stocks	4317	3390	2762	2341	3939	3150	2609	2250
6	Loser	0.0059	0.0060	0.0056	0.0066	0.0046	0.0048	0.0050	0.0068
	Winner	0.0204	0.0205	0.0204	0.0183	0.0204	0.0208	0.0195	0.0169
	WML	0.0145	0.0145	0.0148	0.0116	0.0158	0.0160	0.0145	0.0101
	(t-stat)	3.98	4.10	4.48	3.68	4.40	4.63	4.53	3.24
	# Stocks	3390	2762	2341	2071	3150	2609	2250	1972
9	Loser	0.0056	0.0049	0.0058	0.0078	0.0044	0.0045	0.0067	0.0082
	Winner	0.0212	0.0202	0.0179	0.0142	0.0212	0.0195	0.0167	0.0135
	WML	0.0155	0.0152	0.0122	0.0064	0.0168	0.0150	0.0100	0.0053
	(t-stat)	3.99	4.27	3.50	2.59	4.33	4.28	2.92	1.92
	# Stocks	2762	2341	2071	1786	2609	2250	1972	1718
12	Loser	0.0050	0.0061	0.0076	0.0082	0.0049	0.0063	0.0087	0.0081
	Winner	0.0208	0.0190	0.0171	0.0138	0.0198	0.0182	0.0157	0.0128
	WML	0.0158	0.0129	0.0095	0.0055	0.0149	0.0118	0.0070	0.0047
	(t-stat)	3.78	3.35	2.57	2.00	3.71	3.15	2.92	1.86
	# Stocks	2341	2071	1786	1613	2250	1972	1718	1543

Table 4
Continued

		First Differences with Rowenhorst (1998)							
		Panel C - Ranking t-j-1 to t-2				Panel D - Ranking t-j to t-1			
Ranking Period		Holding Period (K)				Holding Period (K)			
(J)	Portfolio	3	6	9	12	3	6	9	12
3	Loser	-0.0031	-0.0022	-0.0029	-0.0033	-0.0014	-0.0021	-0.0025	-0.0026
	Winner	0.0018	0.0002	0.0015	0.0005	0.0012	0.0002	0.0010	0.0002
	WML	0.0050	0.0024	0.0044	0.0038	0.0025	0.0020	0.0036	0.0029
6	Loser	-0.0036	-0.0030	-0.0036	-0.0038	-0.0026	-0.0028	-0.0038	-0.0038
	Winner	-0.0004	-0.0001	0.0000	-0.0012	0.0000	0.0003	-0.0005	-0.0018
	WML	0.0032	0.0029	0.0036	0.0025	0.0027	0.0032	0.0033	0.0020
9	Loser	-0.0032	-0.0034	-0.0039	-0.0033	-0.0020	-0.0032	-0.0028	-0.0032
	Winner	0.0000	-0.0011	-0.0025	-0.0051	0.0003	-0.0012	-0.0030	-0.0049
	WML	0.0031	0.0023	0.0015	-0.0018	0.0023	0.0020	-0.0002	-0.0017
12	Loser	-0.0034	-0.0033	-0.0032	-0.0039	-0.0028	-0.0030	-0.0023	-0.0044
	Winner	-0.0011	-0.0019	-0.0026	-0.0047	-0.0010	-0.0016	-0.0031	-0.0048
	WML	0.0023	0.0014	0.0006	-0.0009	0.0018	0.0013	-0.0008	-0.0004

Finally, as expected, the continuation effect is stronger for the mid-term ranking period of 6 months, and profits increase when we skip a month between periods. Focusing on panels C and D, the "pseudo reversal effect", documented on the previous subsection, is also present. In all cases, our screened dataset results in a 20% increase in momentum profits, compared to Rouwenhorst results. This increase is especially attributed to a significant 32% decrease, on average, of the estimated profits of loser portfolios, while the differences on winner profits are on average insignificant. Indeed, this phenomenon is strong, as loser premiums are lower for all 32 cases of Table 4. Focusing on the common, 6 months ranking - 6 months investing portfolios, by skipping a month, Loser portfolio premiums are reduced by 0.22% compared to the Rowenhorst. On the other hand the differences on profits of winners are close to zero (0.02%). Overall our estimates are statistically significant except for the extreme 12-12 case of panel B.

Following Rowenhorst (1998), we focus on the buy and hold portfolios that use a 6 month ranking period, and are held for 6 months. Table 5 depicts the analytical results for all 10 decile portfolios for the period from January 1980 to December 1995. MSCI beta is the beta of the underlying portfolio, computed relative to the value weighted MSCI index of the 12 European countries. Average size is the average natural logarithm of the market value of equity of the stocks in the given portfolio. Returns and market values are converted to German marks. Moreover, we report the F-statistic that tests for the equallity of average returns of decile portfolios. By focusing on Table 5, the "pseudo reversal effect in returns is captured on greater detail in the screened returns of the 10 decile portfolios. We document that using our screened dataset, it increases WML profits by 25% (1.45% per month compared to Rowenhorst estimate of 1.16% per month). The increase of the momentum profits, thought, can be attributed, mainly through the reduction of Loser portfolio profits. Indeed, the differentiation of results, is significant only for the bottom 20% of the stocks, where the returns of these portfolios are reduced, on average by 19%. On the other hand the deviation of the estimated returns for the remaining 7 decile portfolios and Winners is insignificantly different from zero. In line with Rouwenhorst(1998) we find that betas have no explanatory power on European momentum profits and the average sizes of our samples are favorably comparable.

Table 5
Returns on Relative Strength Decile Portfolios

At the end of each month,t, all stocks are ranked in deciles based on the previous 6 month performance, that is from t-6 to t-1. The bottom 10% stocks are assigned to the Loser portfolio, while the top 10% to the Winner. The portfolios are initially equally weighted and are help for 6 months, during months t to t+5. Table gives the average monthly buy and hold returns for all 10 decile portfolios for the period of January 1980 to December 1995. Standard deviation of returns is also reported. MSCI beta (b) is the beta of the decile portfolio, computed relative to the value weighted MSCI index of the 12 European markets of the sample. Average Size is the average natural logarithm of the market value of equity of the stocks in the underlying decile portfolio. Market values and returns are computed after converting to German marks. The F-statistic tests for the equallity of the average returns of the 10 decile portfolios.

Prior Return Decile	**Average Return**	**Return Differences** (R-1998)	**Standard Deviation**	**MSCI b**	**Average Size**
Loser	0.0060	-0.0030	0.0615	1.06	5.71
2	0.0080	-0.0016	0.0507	0.98	6.11
3	0.0090	-0.0011	0.0472	0.94	6.18
4	0.0099	-0.0013	0.0452	0.95	6.25
5	0.0109	-0.0005	0.0444	0.94	6.25
6	0.0117	-0.0008	0.0444	0.95	6.28
7	0.0138	0.0003	0.0454	0.96	6.18
8	0.0133	-0.0011	0.0474	1.00	6.19
9	0.0175	0.0010	0.0512	1.03	6.06
Winner	0.0205	-0.0001	0.0622	1.10	6.15
Winner-Loser (WML)	0.0145	0.0029	0.0511	0.08	
(t-stat)	4.10				

F =2.74 (p-value < 0.05)

4 Revising International Momentum Returns

In the previous section, we documented that data outliers have a tendecy to concetrate on the extreme momentum portfolios, especially in the bottom 10 or 20%, that results in a significant overestimation on Loser portfolio profits and consequently on the underestimation of the overall momentum profits internationally. In order to highlight this effect, during the present subsection, we evaluate our filtering procedure to all international markets of our dataset, by presenting revised estimations for the buy and hold momentum profits for all markets of our screened dataset for the period, from the TDS base date for each market, to the 1st Of January 2010. Moreover, we highlight the "pseudo-reversal effect" in returns by comparing the results, in a regional level, against the raw TDS data and a dataset, screened based on the filters proposed by Ince and Porter (2006). Also, for the screened dataset we provide a robustness analysis, concerning the fractile level used for the ranking of stocks in portfolios.

Table 6 reports the average returns of buy and hold momentum strategies for all the markets of our sample, for which at least 30 stocks are available each month, from the TDS base dates to January 2010. Ten markets out of the 62 international markets of our dataset, are excluded from analysis due to limited coverage in terms of the total number of stocks, that is Luxembourg, Romania, Lithouania, Malta, Slovakia, Latvia, Estonia, Bulgaria, Venezuela and Zimbabwe. For the remaining 52 countries, each month, t, we sort stocks on quintiles based on their 6 month past performance, that is t-7 to t-2.. The top 20% of the stocks are assigned to Winner portfolio, while the bottom 20% to the Loser portfolio. All portfolios are equally weighted at formation and held for 6 months, by skipping a month after the ranking of stocks, that is t to t+5. Following common practise, overlapping portfolios are constructed, so as the return of these composite portfolios to be the equal average of the returns to the 6, constantly running vintages. WML is the dirrence, each month, between the return of Winner relative to Loser portfolio.Again due to the limited number of stocks, the analysis for Argentina, Colombia, Cyprus, Hungary, Ireland, Peru and Slovenia is conducted at a 30% top-bottom fractile level for the composite portfolios. Table 6 also reports the starts dates for each market, as long as the total number of stocks that participate in the quintile momentum portfolios[36].

The performace of winner and loser portfolios are also included, and all returns are in local currency and in percent terms. The regional momentum winner,loser and WML portfolios are constructed as in Griffin, Ji and Martin (1993), as the equally weighted average of the portfolios of all markets in the region.

[36] The total number of stocks for the underlying markets may be different than the relevant entries of Table 2. That is, all stocks of our dataset does not have sufficient data to participate in a buy and hold momentum analysis.

Table 6
International Buy and Hold Momentum Profits 1964/1973-2010.
Table reports the average returns of buy and hold momentum portfolios for the 52 international countries of our sample, for which at least 30 stocks are available each month. Each month, t, all stocks of a given market, are ranked into quintiles based on their prior 6 months performance, during the months t-7 to t-2. The top 20% of the stocks are assigned to Winner Portfolio, while bottom 20% to Loser Portfolio. These portfolios are equally weighted and are held for six months by skipping a month after ranking of stocks, that is months t to t+5. Overlapping composite portfolios are constructed as in Jagedeesh and Titman (1993), so the return of portfolios is computed,each month, as the equally weighted sum of the 6 running vintages.Due to limited number of stocks the analysis for Cyprus, Hungary, Ireland, Argentina, Colombia, Peru and Slovenia is conducted on a 30% fractile for the sorting of stocks. WML is the dirrence, each month, between the return of Winner relative to Loser portfolio. Regional series are constructed as the equally weighted sum of all countries in a region. Base dates are also reported as long as the total number of stocks that participate in the quintile portfolios. All returns are in local currency and in percent terms

Country / Region	Base Date	Total # of Stocks	WML	t-stat	Winners	t-stat	Losers	t-stat
Austria	Jan1972	162	0.7805	2.49	1.1521	3.49	0.3716	0.90
Belgium	Jan1973	172	0.9640	2.80	1.3575	3.82	0.3936	0.90
Czech Republic	Jun1993	111	1.1361	1.58	1.5136	2.67	0.3775	0.43
Cyprus (30%)	Dec1992	34	1.3882	1.29	1.2843	0.91	-0.1040	-0.07
Denmark	Jan1973	224	1.0465	3.64	1.3498	4.60	0.3033	0.80
Finland	Jan1987	154	0.5258	1.96	1.9166	3.29	1.3908	2.38
France	Jan1973	1083	1.0158	4.09	1.7974	5.54	0.7816	1.90
Germany	Jan1973	1070	0.9597	3.96	1.1316	3.86	0.1719	0.48
Germany (XETRA)	Jul1991	700	0.5959	1.47	0.8270	1.90	0.2310	0.35
Greece	Jan1988	391	0.7406	1.50	1.8702	2.33	1.1296	1.47
Hungary (30%)	Jan1991	47	1.5084	2.96	1.8953	2.76	0.3870	0.52
Ireland (30%)	Jun1965	36	0.1263	0.17	1.2240	2.13	1.0977	1.31
Italy	Jan1973	446	1.0813	3.42	1.2465	3.02	0.1651	0.37
Netherlands	Jan1973	237	0.9757	3.60	1.5041	5.06	0.5284	1.45
Norway	Feb1973	341	1.1686	3.03	2.1669	4.47	0.9983	1.75
Poland	Apr1991	393	0.8345	2.13	3.0633	2.66	2.2288	2.24
Portugal	Jan1988	87	1.2220	2.63	1.4435	3.08	0.2215	0.38
Russian Federation	Mar1998	86	1.0846	2.12	4.0164	3.81	2.9318	2.24
Slovenia (30%)	Jan1996	38	-0.0983	-0.26	1.0412	2.05	1.1395	2.04
Spain	Jan1986	225	0.2671	0.79	0.9708	2.42	0.7038	1.31
Sweden	Jan1982	763	0.6025	1.52	1.9202	4.68	1.3176	2.27
Switzerland	Jan1973	364	1.1784	3.91	1.5210	4.53	0.3426	0.89
Turkey	Jan1988	310	-1.0348	-1.69	3.3003	3.15	4.3350	3.88
UK	Jan1965	2482	0.4145	2.53	1.5390	4.88	1.1245	2.88
Europe	**Jan1965**	**9956**	**0.7584**	**5.31**	**1.7064**	**7.51**	**0.9480**	**3.69**
Europe Ex. UK	**Jan1973**	**7474**	**0.9775**	**6.75**	**1.7471**	**7.12**	**0.7696**	**2.75**
Argentina (30%)	Jan1980	71	-0.9464	-1.89	3.4750	2.33	4.4214	2.64
Brazil	Jan1993	179	-0.3192	-0.42	2.2881	3.58	2.6072	2.55
Canada	Jan1973	2063	0.6358	2.39	1.1387	3.54	0.5029	1.34
Chile	Jul1989	118	1.3791	3.50	2.5226	5.02	1.1435	2.11
Colombia (30%)	Jan1992	32	0.3495	0.56	3.5166	3.94	3.1672	3.95
Mexico	Oct1987	146	0.9576	2.03	2.9777	4.75	2.0200	3.24
Peru (30%)	Jan1991	55	-0.5636	-0.64	1.3920	1.56	1.9556	1.99
Americas Ex. USA	**Jan1973**	**2664**	**0.8032**	**3.32**	**1.8931**	**5.73**	**1.0899**	**2.96**
USA	Jan1973	11955	0.4643	2.13	1.6490	5.35	1.1847	3.29
North America	Jan1973	12905	0.6765	3.62	1.6421	5.62	0.9655	3.17

Table 6
Continued

Country / Region	Base Date	Total # of Stocks	WML	t-stat	Winners	t-stat	Losers	t-stat
Australia	Jan1973	950	1.0094	3.61	1.5690	4.02	0.5596	1.61
China	Oct1991	1640	0.2839	0.83	2.0582	1.84	1.7744	1.72
Hong Kong	Jan1973	762	0.6576	1.94	1.4177	2.52	0.7601	1.14
India	Jan1990	3357	0.9069	1.67	2.8890	3.66	1.9820	2.05
Indonesia	Apr1990	268	0.4575	0.76	1.8030	2.27	1.3456	1.39
Israel	Jan1986	571	0.8648	1.76	1.7836	2.66	0.9189	1.12
Japan	Jan1973	3245	-0.0763	-0.31	0.8214	2.67	0.8977	2.45
Malaysia	Jul1983	805	0.0083	0.02	1.0672	1.88	1.0590	1.43
New Zealand	Jan1986	126	0.9534	2.64	1.4611	3.99	0.5077	1.25
Pakistan	Jan1991	177	0.4251	0.73	1.8997	2.25	1.4746	1.42
Philippines	Sep1987	169	0.1701	0.26	1.6155	2.41	1.4454	1.64
Singapore	Jan1973	236	-0.0682	-0.21	0.9476	2.18	1.0157	1.95
South Korea	Jul1984	2238	-0.3263	-0.71	1.4654	2.43	1.7917	2.40
Sri Lanka	Jun1987	151	-0.1241	-0.22	1.0753	1.48	1.1994	1.45
Taiwan	Sep1987	878	-0.1769	-0.46	0.9880	1.46	1.1649	1.56
Thailand	Jan1987	621	0.1928	0.35	1.5375	2.19	1.3447	1.46
Asia	**Jan1973**	**16194**	**0.1918**	**1.05**	**1.4983**	**5.60**	**1.3065**	**4.45**
Asia Ex. Japan	**Jan1973**	**12949**	**0.3233**	**1.98**	**1.6002**	**4.65**	**1.2769**	**3.36**
Bangladesh	Jan1992	252	1.6539	2.44	2.4277	3.05	0.7738	1.04
Egypt	Sep1995	121	0.5352	0.86	2.0391	2.24	1.5039	1.63
Morocco	Jul1993	62	0.2362	0.41	1.3304	2.34	1.0943	1.61
South Africa	Jan1973	453	0.9764	2.13	2.3005	4.65	1.3241	2.51
Africa	**Jan1973**	**888**	**0.7000**	**1.93**	**2.1618**	**5.02**	**1.6695**	**3.49**
World	Jan1965	41778	0.5887	4.85	1.6963	7.95	1.1077	4.73
WorldExUSA	Jan1965	29823	0.5964	4.87	1.6995	7.96	1.1031	4.72
WorldExUSAExUK	Jan1973	27341	0.7458	6.53	1.7294	7.76	0.9836	3.97
Develloped	Jan1965	28291	0.6520	4.88	1.5287	7.16	0.8767	3.60
DevellopedExUsa	Jan1965	16336	0.6666	4.96	1.5234	7.13	0.8567	3.53
DevellopedExUsaExUK	Jan1973	13854	0.8359	6.37	1.5065	6.75	0.6706	2.58
Emerging	Jan1973	13487	0.3116	1.39	2.4560	6.35	2.1444	5.41

Table 6 shows positive significant momentum profits for 42 out of the 52 international markets of our sample, as long as to all reported regions. For Argentina and Turkey, as we expected from the previous results of this section, a marginally significant negative premium is reported. For the rest of the cases, that is Singapore, South Korea, Sri Lanka, Taiwan, Peru, Brazil and Slovenia, the premiums cannot be estimated as significantly different from zero. In Europe, the momentum effect is strong until 2010, were on average winners outperform losers by 1% per month. Overall for the European region (excluding UK) a significant 0.98 % premium is documented, where a positive momentum premium is refered to 22 out of the 24 European markets of our sample. Interestingly the momentum premium for the UK is almost half, compare to the European region and is estimated to a significant 0.42%[37], which lowers the performance of the region, when included. Americas (excluding USA), USA and Africa apear also to have significant positive momentum premiums of 0.80%, 0.46% and 0.70% respectively. Moreover, in North American region, where USA and Canda are included, we estimate a signifivant 0.67% premium which is favorably comparable with the estimate of 0.65% in Fama-French (2010)[38]. Asia (excluding Japan), as expected, is refered to a low but significant premium of 0.32% and momentum is still absent from the Japanese exchanges (0%). Overall in a global level momentum is estimated to a significant 0.59%, also extremely close to the Fama-French(2010) estimate of 0.61%), which increases to 0.75% by excluding USA and UK. Finally it seams that momentum is doubled for Develloped countries (0.65%) compared to the emerging ones (0.31%). The premiums for the Develloped countries is almost 3 times lager by excluding USA and UK (0.84%).

In order to furthet investigate the "pseudo reversal" effect in momentum returns, identified earlier in this section, we compare our results by using 2 additional datasets. The first dataset is obtained by applying the filters proposed by Ince and Porter (2006), (IP filters), which are widely referenced in studies that are based on TDS data. Moreover we recalculate returns using the raw data, without any screen, as obtained by TDS. Table 7 presents the buy and hold momentum returns, as calculated by the 3 datasets. Due to space limitations, the estimates are only shown at the regional level, the implications though, for individual countries are relevant. The estimates under our filters (LS Filters) are obviously the same as presented in table 6. The number of stocks is also reported.

Focusing on the total number of stocks of the 3 underlying datasets, the decrease of stocks for the LS dataset is significantly larger than the decrease for IP, compared to raw data. Under our filtering procedure,analyzed in section 2, these stocks are interpreted as clear outliers, as beeing completely filtered out in our dataset. Moreover, based on portfolio returns it is obvious that moving from raw to IP and LS filters the return on momentum portfolios linearly increases. This significanrt increase is mainly attributed to

[37] Computing the results for UK, from 1969 to 2000, we estimate a significant premium of 1%, which shows that momentum has attenuated in London stock exchange over the last decade.

[38] Fama and French (2010) use data from Bloomberg, which adds to the comparison of our screened database with accurate third party databases.

a vast , again linear, decrease in the profits of loser portfolios. In the other hand the impact on winners seams to be smaller and of undoupt direction. As it is obvious winners are strongly infuenced by positive return outliers, that is the winner portfolios of the raw sample outperforms LS and IP portfolios in all cases. As the presents of extreme positive return outliers is effectively captured by IP Filters, the rest of remaining outliers do not have a clear effect on Winners. That is comparing IP and LS portfolios, the returns on 5 regions are insignifically different from zero, while the rest have either a negative or a positive impact. On the other hand, outliers have a strong and significant negative effect to loser returns as the returns of loser portfolios decrease linearly for all regions, as we move from IP to LS filtered datasets. Moreover the same inferences are drown by directly comparing LS and raw data, momentum returns increase significantly for all cases, due to a vast decrease in loser portfolios, consistently for all regions. The fact that positive extreme return outliers, constitute for more than 95% of the total number of extreme return outliers for all markets, this decrease on loser portfolio returns cannot be attributed to some few negative outliers. Just to mention an example, in the case of Americas (excluding USA), the raw return of 18.7% of loser portfolios, is clearly affected by extreme outliers, which reduces to 4.2% (a 77% decrease), after imposing return filters of IP. Still though, a high number of outliers remains in sample, where our filters impact on a further decrease loser returns, by 74%, to 1.08%.cAs expected the effect is stronger for the emerging compared to develloped countries, where small markets are in general more possible to suffer more from errors and data inconsistencies[39]. Finally the same implications derive from the analysis in individual markets. Our filters increase the returns of momentum portfolios to 45 and 39 out of 52 markets compared to the raw and IP filtered database respectively, while the returns on looser portfolios are also decreased for 47 and 40 cases respectively.

Concluding this section, we investigate the strength of the continuation of returns relative to the portion of the total stocks that we use, in each market, in order to measure momentum profits. In other words we show how strong momentum profits are influenced by the fractile used to sort stocks on prior performance. Table 8 reports the regional average returns on buy and hold momentum , winner and loser portfolios based on 5 dirrenent fractile levels : 10% (deciles), 15%, 20%(quintiles),25% and 30%. Obviously, the 20% case are the same results, as shown in Table 6.

Based on Table 8, increasing the number of fractiles is strongly negatively related with momentum profits for all regions. By lowering the bounds in defining the extreme top-bottom portfolios, from 30% to 15%, momentum profits increase linearly for all regions and worldwide. Restricting more the analysis, on the extreme top-bottom 10% momentum profits is further increasing returns for Europe, UK, USA and Africa, while is significantly decreasing momentum profits for Australasia, Americas and Emerging markets. Eventually, the differences in worldwide level are not significant.

[39] This implication derives for Table 4 in the online appendix.

Table 7
"Pseudo-Reversal" Effect - Regions
Table reports regional buy and hold momentum, winner and loser returns for 3 datasets. Our complete screened and corrected DTS dataset, a dataset based on filters proposed by Ince and Porter (2006) and the raw dataset, as obtained by TDS. Each month, t, all stocks of a given market, are ranked into quintiles based on their prior 6 months performance, during the months t-7 to t-2. The top 20% of the stocks are assigned to Winner Portfolio, while bottom 20% to Loser Portfolio. These portfolios are equally weighted and are held for six months by skipping a month after ranking of stocks, that is months t to t+5. Overlapping composite portfolios are constructed as in Jagedeesh and Titman (1993), so the return of portfolios is computed,each month, as the equally weighted sum of the 6 running vintages.Regional series are constructed as the equally weighted sum of all countries in a region. The countries for each region are those that appear on Table 9. Base dates are also reported as long as the total number of stocks that participate in the quintile portfolios. All returns are in local currency and in percent terms. The end date for all regions is January 2010.

			Landis and Skouras (2012) Filters					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.7584	5.31	1.7064	7.51	0.9480	3.69
Europe Ex. UK	Jan73	7584	0.9775	6.75	1.7471	7.12	0.7696	2.75
Americas Ex. USA	Jan73	2675	0.8032	3.32	1.8931	5.73	1.0899	2.96
USA	Jan73	11955	0.4643	2.13	1.6490	5.35	1.1847	3.29
Australasia	Jan73	16194	0.1918	1.05	1.4983	5.60	1.3065	4.45
Australasia Ex. Japan	Jan73	12949	0.3233	1.68	1.6002	4.65	1.2769	3.36
Africa	Jan73	888	0.6997	1.93	2.1618	5.02	1.6695	3.49
World	Jan65	41778	0.5887	4.85	1.6963	7.95	1.1077	4.73
World Ex. USA	Jan65	29823	0.5964	4.87	1.6995	7.96	1.1031	4.72
World Ex. USA & UK	Jan73	27341	0.7458	6.53	1.7294	7.76	0.9836	3.97
Develloped	Jan65	28291	0.6520	4.88	1.5287	7.16	0.8767	3.60
Develloped Ex. Usa	Jan65	16336	0.6666	4.96	1.5234	7.13	0.8567	3.53
Develloped Ex. Usa & UK	Jan73	13854	0.8359	6.37	1.5065	6.75	0.6706	2.58
Emerging	Jan73	13487	0.3116	1.39	2.4560	6.35	2.1444	5.41
			Ince and Porter (2006) Filters					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	17614	0.6429	6.42	1.7038	10.08	1.0609	5.51
Europe Ex. UK	Jan73	11584	0.6875	5.61	1.5651	8.57	0.8775	4.25
Americas Ex. USA	Jan73	5921	-0.4476	-0.72	3.7807	7.53	4.2283	5.94
USA	Jan73	14278	0.3669	1.83	1.6939	5.85	1.3270	3.89
Australasia	Jan73	20476	0.0006	0.00	1.5369	6.76	1.5363	5.64
Australasia Ex. Japan	Jan73	16997	0.0149	0.07	1.6425	6.25	1.6276	5.29
Africa	Jan73	1445	0.6996	2.21	2.6511	7.63	1.9516	5.09
World	Jan65	59734	0.3541	3.30	1.9017	11.53	1.5476	8.10
World Ex. USA	Jan65	45456	0.3526	3.25	1.9042	11.57	1.5516	8.15
World Ex. USA & UK	Jan73	39426	0.3276	2.46	1.8193	10.26	1.4917	7.26
Develloped	Jan65	40503	0.5944	5.88	1.5459	8.96	0.9515	4.76
Develloped Ex. Usa	Jan65	26225	0.6043	6.00	1.5347	8.93	0.9304	4.69
Develloped Ex. Usa & UK	Jan73	20195	0.6339	5.17	1.3626	7.34	0.7287	3.41
Emerging	Jan73	19231	-0.2846	-0.79	2.9846	8.16	3.2692	7.37

Table 7
Continued

			Raw TDS Data					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	20773	-0.8030	-0.82	1.9125	12.13	2.7155	2.74
Europe Ex. UK	Jan73	14396	-0.8170	-0.81	1.8891	11.47	2.7061	2.64
Americas Ex. USA	Jan73	10448	-13.5462	-2.18	5.1645	8.62	18.7107	3.00
USA	Jan73	15549	-0.5767	-2.11	5.0552	1.55	5.6318	1.67
Australasia	Jan73	24264	-1.2515	-1.63	1.8897	8.20	3.1412	4.08
Australasia Ex. Japan	Jan73	20772	-1.4683	-1.56	2.0196	7.84	3.4880	3.72
Africa	Jan73	1769	0.6784	2.08	3.4466	9.28	2.7682	6.93
World	Jan65	72803	-2.1169	-2.54	2.3448	14.41	4.4617	5.27
World Ex. USA	Jan65	57254	-2.1609	-2.53	2.3077	14.77	4.4686	5.17
World Ex. USA & UK	Jan73	50877	-2.2092	-2.52	2.2874	14.04	4.4966	5.07
Develloped	Jan65	51302	0.0043	0.02	1.8941	9.72	1.8898	5.87
Develloped Ex. Usa	Jan65	35753	0.0212	0.08	1.7837	10.99	1.7624	5.66
Develloped Ex. Usa & UK	Jan73	29376	0.0201	0.07	1.7616	10.41	1.7416	5.32
Emerging	Jan73	21501	-6.3484	-2.30	3.4276	10.67	9.7759	3.52

Moreover this effect is driven bothly by winners and loosers, as both Winner portfolio returns increase and loser returns decrease as we move from the 30% to 15% level of analysis. Interestingly, restrincting on the top 10% does not affect winners but it rather lowers further the loser profits for the above regions. That's true for all cases, except USA where winners are increased by 0.10%. Overall the continuation of returns appears to be significantly stronger as we lower the bounds of the extreme portfolios to 10%-15%, where it appears to be slightly wider for the relatively small markets and regions.

5 Conclusion

This paper, reevaluates international momentum evidence based on a screened and corrected database of 52 International markets from Thompson Datastream. In a first step we expand all previous evidence in building an adequate filtering procedure based on daily data for all equities of TDS universe for the underlying stock exchange markets. We, then, use our screened database to reexamine the 2 most widely referenced papers of international momentum litterature, that is Griffin, Ji and Martin(2003) and Rouwenhorst (1998). We document a significant mispricing on international and regional momentum returns, which is mainly attributed to the overestimation of loser portfolio profits. This "pseudo-reversal" effect is caused by outliers that tend to be located in the extreme deciles or quintiles, influencing mostly the losers. This effect is present in both studies and reduces the estimations of momentum profits by 20%, while the overestimations of losers is estimated around 30%. Moreover, we re-examine momentum in 52 international markets and 4 regions, based on period covered by TDS, from December 1964 to January 2010. We document strong momentum profits in 42 markets and all in all regions we examine. In addition, we evaluate the "pseudo-reversal" effect by comparing our filtering procedure against both the filters proposed by Ince and Porter, and the raw DTS data. We document that controlling for the effect linearly increases momentum, as we move from the raw sample to our complete screened and corrected dataset. In addition, we explore the relation between momentum profits and the level we use to define the extreme top-bottom momentum portfolios, and we show that the continuation of returns is negatively is stronger at a 10% level for Europe, USA, UK and Africa, while for the smallest-emerging markets, America (excluding USA) and Asia, in a wider 15% level. At the same time a strong negative relation exists, as profits linerly decrease as we move from a 30% to a 10-15% level.

Table 8
Momentum Profits VS Top-Bottom fractile levels
Table reports the average returns on buy and hold momentum , winner and loser portfolios based on 5 dirrenent fractile level,k, for the classification of stocks. For each month, t, stocks in each country are ranked into k fractile groups based on their performance over the 6 months t-7 to t-2. The top k % of the stocks are assigned to Winner Portfolio, while bottom k % to Loser Portfolio. These portfolios are equally weighted and are held for six months by skipping a month after ranking of stocks, that is months t to t+5. Overlapping composite portfolios are constructed as in Jagedeesh and Titman (1993), so the return of portfolios is computed,each month, as the equally weighted sum of the 6 running vintages.Regional series are constructed as the equally weighted sum of all countries in a region. The countries for each region are those that appear on Table 9. Base dates are also reported as long as the total number of stocks that participate in the quintile portfolios. All returns are in local currency and in percent terms. The end date for all regions is January 2010. The momentum strategy buys the winner top (kth) portfolio and sells short the loser-bottom portfolio
.

			Top - Bottom 10%					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.9041	4.86	1.7001	7.02	0.7960	2.75
Europe Ex. UK	Jan65	7584	1.1659	6.46	1.7719	7.14	0.6060	1.98
UK	Jan73	2482	0.7171	1.76	1.5148	3.82	0.7977	1.62
Americas Ex. USA	Jan73	2675	0.7914	2.62	1.9449	5.59	1.1535	2.81
USA	Jan73	11955	0.6211	2.25	1.8278	5.25	1.2067	2.91
Australasia	Jan73	16194	0.1231	0.52	1.4023	4.96	1.2792	4.00
Australasia Ex. Japan	Jan73	12949	0.2722	1.17	1.5478	4.41	1.2756	3.12
Africa	Jan73	888	1.0904	2.00	2.2746	5.01	1.1842	2.13
World	Jan65	41778	0.6480	4.13	1.6822	7.39	1.0342	3.96
World Ex. USA	Jan65	29823	0.6370	4.01	1.6747	7.39	1.0378	3.99
World Ex. USA & UK	Jan73	27341	0.7995	5.44	1.7212	7.57	0.9218	3.41
Develloped	Jan65	28291	0.7304	4.24	1.5594	6.77	0.8290	3.03
Develloped Ex. Usa	Jan65	16336	0.7294	4.19	1.5435	6.73	0.8141	2.99
Develloped Ex. Usa & UK	Jan73	13854	0.9150	5.46	1.5589	6.75	0.6439	2.26
Emerging	Jan73	13487	0.2901	1.05	2.1252	5.82	1.8351	4.24
			Top - Bottom 15%					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.8743	5.57	1.7394	7.57	0.8651	3.26
Europe Ex. UK	Jan65	7584	1.0825	6.77	1.7818	7.18	0.6993	2.42
UK	Jan73	2482	0.6918	2.16	1.6182	4.92	0.9264	2.16
Americas Ex. USA	Jan73	2675	0.9520	3.58	2.0008	5.82	1.0487	2.75
USA	Jan73	11955	0.5377	2.21	1.7282	5.32	1.1905	3.11
Australasia	Jan73	16194	0.2017	0.97	1.4612	5.30	1.2596	4.11
Australasia Ex. Japan	Jan73	12949	0.4272	1.95	1.6360	4.66	1.2088	3.05
Africa	Jan73	888	0.7545	1.65	2.3701	5.33	1.6156	3.17
World	Jan65	41778	0.6896	5.15	1.7389	8.08	1.0493	4.34
World Ex. USA	Jan65	29823	0.6979	5.17	1.7416	8.11	1.0437	4.33
World Ex. USA & UK	Jan73	27341	0.8420	6.56	1.7782	7.93	0.9361	3.65
Develloped	Jan65	28291	0.7494	5.10	1.5642	7.23	0.8148	3.24
Develloped Ex. Usa	Jan65	16336	0.7646	5.17	1.5565	7.20	0.7919	3.16
Develloped Ex. Usa & UK	Jan73	13854	0.9264	6.34	1.5422	6.83	0.6158	2.29
Emerging	Jan73	13487	0.4468	1.79	2.5938	6.82	2.1469	5.13

Table 8
Continued

			Top - Bottom 20%					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.7584	5.31	1.7064	7.51	0.9480	3.69
Europe Ex. UK	Jan65	7584	0.9775	6.75	1.7471	7.12	0.7696	2.75
UK	Jan73	2482	0.4145	1.53	1.5390	4.88	1.1245	2.88
Americas Ex. USA	Jan73	2675	0.8032	3.32	1.8931	5.73	1.0899	2.96
USA	Jan73	11955	0.4643	2.13	1.6490	5.35	1.1847	3.29
Australasia	Jan73	16194	0.1918	1.05	1.4983	5.60	1.3065	4.45
Australasia Ex. Japan	Jan73	12949	0.3233	1.68	1.6002	4.65	1.2769	3.36
Africa	Jan73	888	0.4923	1.23	2.1618	5.02	1.6695	3.49
World	Jan65	41778	0.5887	4.85	1.6963	7.95	1.1077	4.73
World Ex. USA	Jan65	29823	0.5964	4.87	1.6995	7.96	1.1031	4.72
World Ex. USA & UK	Jan73	27341	0.7458	6.53	1.7294	7.76	0.9836	3.97
Develloped	Jan65	28291	0.6520	4.88	1.5287	7.16	0.8767	3.60
Develloped Ex. Usa	Jan65	16336	0.6666	4.96	1.5234	7.13	0.8567	3.53
Develloped Ex. Usa & UK	Jan73	13854	0.8359	6.37	1.5065	6.75	0.6706	2.58
Emerging	Jan73	13487	0.3116	1.39	2.4560	6.35	2.1444	5.41
			Top - Bottom 25%					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.6455	5.23	1.6266	7.39	0.9811	3.98
Europe Ex. UK	Jan65	7584	0.7724	5.94	1.6348	6.93	0.8624	3.18
UK	Jan73	2482	0.4486	1.90	1.5330	5.06	1.0844	2.95
Americas Ex. USA	Jan73	2675	0.6673	3.12	1.8757	5.89	1.2085	3.46
USA	Jan73	11955	0.4129	2.09	1.5945	5.42	1.1816	3.44
Australasia	Jan73	16194	0.1325	0.79	1.4697	5.71	1.3372	4.69
Australasia Ex. Japan	Jan73	12949	0.2151	1.29	1.5176	4.59	1.3026	3.52
Africa	Jan73	888	0.4635	1.26	2.0697	4.69	1.6062	3.20
World	Jan65	41778	0.5119	4.89	1.6321	7.86	1.1203	4.96
World Ex. USA	Jan65	29823	0.5157	4.90	1.6333	7.86	1.1176	4.97
World Ex. USA & UK	Jan73	27341	0.5933	5.73	1.6443	7.58	1.0511	4.35
Develloped	Jan65	28291	0.5637	4.81	1.4614	7.03	0.8977	3.82
Develloped Ex. Usa	Jan65	16336	0.5729	4.87	1.4545	6.99	0.8817	3.76
Develloped Ex. Usa & UK	Jan73	13854	0.6651	5.53	1.4187	6.53	0.7536	2.97
Emerging	Jan73	13487	0.3582	1.67	2.3825	6.08	2.0243	4.72
			Top - Bottom 30%					
Region	**Base Date**	**Total # of Stocks**	**WML**	**t-stat**	**Winners**	**t-stat**	**Losers**	**t-stat**
Europe	Jan65	10066	0.5783	5.12	1.5809	7.31	1.0026	4.17
Europe Ex. UK	Jan65	7584	0.6627	5.47	1.5801	6.80	0.9174	3.47
UK	Jan73	2482	0.4282	2.00	1.5141	5.17	1.0860	3.08
Americas Ex. USA	Jan73	2675	0.3589	1.46	2.3723	6.03	2.0135	4.60
USA	Jan73	11955	0.3622	2.01	1.5484	5.45	1.1862	3.60
Australasia	Jan73	16194	0.0678	0.44	1.5717	5.94	1.5039	5.25
Australasia Ex. Japan	Jan73	12949	0.0127	0.07	1.6974	4.68	1.6847	4.43
Africa	Jan73	888	0.4930	1.50	2.0179	4.48	1.5249	3.13
World	Jan65	41778	0.4298	4.42	1.6605	8.04	1.2307	5.51
World Ex. USA	Jan65	29823	0.4315	4.39	1.6657	8.06	1.2342	5.53
World Ex. USA & UK	Jan73	27341	0.4656	4.66	1.6922	7.78	1.2266	5.10
Develloped	Jan65	28291	0.4973	4.60	1.4341	6.96	0.9368	4.08
Develloped Ex. Usa	Jan65	16336	0.5042	4.64	1.4293	6.93	0.9251	4.03
Develloped Ex. Usa & UK	Jan73	13854	0.5587	4.93	1.3942	6.43	0.8356	3.37
Emerging	Jan73	13487	0.0607	0.23	2.6851	6.95	2.6244	5.67

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A APPENDIX

A.1 Thompson Datastream Datatype Definitions

Table A.1
Thompson Datastream Datatypes Definitions
Table provides definitions for all TDS time series datatypes, referenced in this study. Panel A contains definitions for the static reference variables and Panel B for time series. Datatype refers to the identification code that Datastream assigns to each variable. All Definitions are provided by Datastream Extranet and Datastream Navigator help files.[1]

Panel A - Static Variables

Variable	Definition	Datatype
Mnemonic	This is a unique identification code, assigned by Datastream[2]	MNEM
TDS Code	This is the unique six-digit identification code for every stock, allocated by Datastream.	DSCD
Stock Exchange Mnemonic	This datatype returns the Datastream exchange code that is based on the ISO standard exchange code.	EXMNEM
Type of equity	This datatype indicates the type of instrument requested.	TYPE,
WSC Type	Type of instrument provided by Worldscope.	WC06005
Currency	This is the currency in which the variable is quoted and displayed.	CURRENCY
Status of equity	This datatype gives trading status of the equity.[3]	ESTAT
Geographical group	This datatype returns a geographical classification of company by name. which specifying the home or listing country of a company security.	GEOGN
Security Name	This is the name of the equity/company or equity list, as stored on Datastreams databases.	NAME
Expanded Name	Expanded name of the underlying Security.	ENAME
CUSIP	CUSIP represents the national security identification number for U.S. and Canadian companies. The first six digits of this number represent the company. The next two digits represent the security and the last digit is a check digit.	WC06004
Major Listing Flag	For companies with more than one equity Security MAJOR indicates which of the securities is the most significant in terms of market value and liquidity of the primary quotation of that security. Only one security per company is assigned as the major	MAJOR
Industry Name/Code	This datatype returns the Datastream level 6 industrial classification name/code	INDM/INDC
Base Date	The base date is the date from which Datastream holds information about the issue/security.	BDATE
Latest Value	Time records the date or time of the latest active equity price data	TIME

[1] http://product.datastream.com/Navigator/HelpFiles/DatatypeDefinitions/en/ , http://extranet.datastream.com/

[2] Datastream Mnemonics follow the mnemonics used by stock exchanges and so these unique identifiers change through time, at cases when a stock is delisted and it's mnemonic is passed to a new issued equity. This issue can affect the update of TDS user lists that have been constructed based on MNEM.

[3] Trading Status of an equity can be active, dead or suspended.

Table A.1
continued

Panel B - Time Series Variables		
Variable	**Definition**	**Datatype**
Price	Datatype (P) represents the official closing price.	P
(Adjusted-Default)	Closing Prices are adjusted for subsequent capital actions, a nd this adjusted figure then becomes the adjusted-default price offered on all Research programs.	
Unadjusted Price	This is the actual raw recorded closing price which has not been historically adjusted for capital issues.	UP
Total Return Index	Total Return index (RI) shows a theoretical growth in value of a share holding over a specified period, assuming that dividends are re-invested to purchase additional units of an equity at the closing price applicable on the ex-dividend date.	RI
Market Value	Market value is the share price multiplied by the number of ordinary shares in issue. The amount in issue is updated whenever new tranches of stock are issued or after a capital change. For companies with more than one class of equity capital, the market value is expressed according to the individual issue.	MV
Volume	Volume shows the number of shares traded for a stock on a particular day. Both daily and non-daily figures are adjusted for capital events.	VO
Dividend Rate Adjusted (Ex Date)	DDE is the most recent actual dividend payment. This represents an individual cash income dividend payment adjusted for any capital change since the ex-dividend date of that payment. The data displayed is based upon the dividend whose EX-DIVIDEND DATE is most recent to the user's request date.	DDE