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The Relative Performance of Small Cap Firms and Default Risk across the Business Cycle: International Evidence

Lorne N. Switzer*
Van Berkom Endowed Chair of Small-Cap Equities and Associate Director, Institute for Governance in Private and Public Organizations, John Molson School of Business
Concordia University, 1455 de Maisonneuve Blvd. W.
Montreal, Quebec, Canada H3G 1M8
switz@jmsb.concordia.ca

ABSTRACT

The time-varying nature of the firm size effect has been the subject of growing interest, particularly in the aftermath of the recent financial crisis. Small-cap firms provide a significant nexus for entrepreneurship and innovation and hence might be viewed as less prone to governance problems than large firms. This could in part explain the superior performance of small-cap firms over long time horizons, although leverage, which may be exacerbated during downturns, may hinder their short-term performance. Moscarini and Postel-Vinay (2009) suggest that the small cap premium is linked to job creation: large employers destroy proportionally more jobs during and right after recessions, and create proportionally more jobs late in expansions, relative to small employers. This differential is shown to explain in part the superior performance of US small firms during recoveries (Moscarini and Postel-Vinay, 2010). Switzer (2010) shows that the US small cap premium is significantly related to default risk in the economy, which may impact on investments in R&D and innovation. This paper looks at the impact of the business cycle on the small cap premium internationally. The sample consists of small cap and large cap returns of G-7 countries and the MENA region. Default risk, which may be tied to innovative investments, is not priced in non-common law settings, where protection of shareholders and creditors in bankruptcy states is limited.

JEL Classifications: *G11, G14, G15*

Keywords: *international small-cap performance; entrepreneurship and innovation; business cycle effect; default risk; legal regime*

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I. INTRODUCTION

The time-varying nature of the firm size effect has been the subject of growing interest, particularly in the aftermath of the recent financial crisis. Small-cap firms provide a significant nexus for entrepreneurship and innovation and hence might be viewed as less prone to governance problems than large firms.[1] This could in part explain the superior performance of small-cap firms over long time horizons, and during times of recovery from economic downturns. Lower productivity and high exposure to debt may in part explain their underperformance over recessions, as reported in the academic literature[2] and in the popular press.[3]

Kim and Burnie (2002) suggest that the time-varying nature of the firm size effect may be attributable to the business cycle *per se*, as captured by dummy variables in their regression model**.** Smaller firms may also suffer from relatively lower productivity and high financial leverage during downturns (Chan and Chen, 1991)**.** More recently, Switzer (2010) shows that the US small cap premium is significantly related to default risk in the economy, which may impact investments in R&D and innovation. This paper extends previous work that has focused on the US to look at the impact of the business cycle on the small cap premium internationally, in particular, for stocks in G-7 countries and in the Middle-East North African (MENA) region. New evidence is presented indicating that default risk, which may be tied to innovative investments, is not priced in non-common law settings where protection of shareholders and creditors in bankruptcy states is limited.

The remainder of this paper is organized as follows. The data are described in Section II. Section III looks at the innovative efforts and performance of small-caps vs. large caps across countries over recent business cycle peaks and troughs. Section IV revisits the small cap premium for G-7 and MENA countries. As is shown therein, the small firm anomaly appears to be largely a North American phenomenon in the post 2000 period. Section V looks at business cycle effects and the impact of various risk factors on the time variation of the small firm premia across countries. The paper concludes with a summary in Section VI.

II. DESCRIPTION OF THE DATA

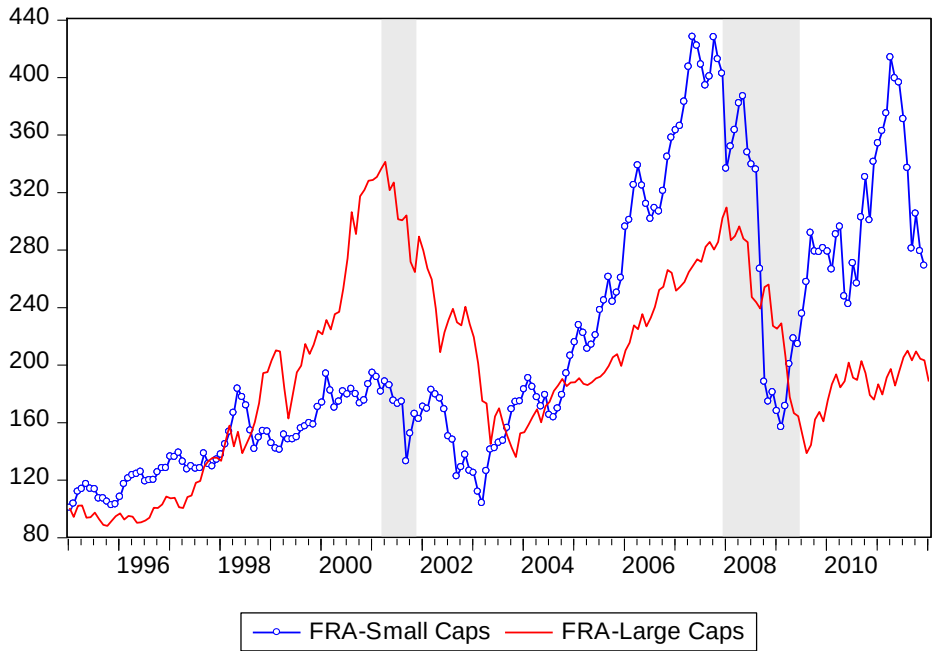
The small cap and large cap portfolios for the returns for France, Germany, Italy, Japan and the UK, are the Morgan Stanley portfolio size based series that begin in January 1995. The US small cap series is based on monthly returns on the Ibbotson/DFA small stock portfolio, which is available from January 1926. The U.S. large cap portfolio from Morningstar/Ibbotson is the S&P 500. The U.S. market portfolio proxy is the CRSP value weighted portfolio of NYSE, AMEX and NASDAQ stocks, which is available since 1926. The US risk free rate is the 1 month T-bill rate, from WRDS. For the series, the only continuous extant proxy for Canadian small firms is Nesbitt Burns Small Cap Index, which is available since producing a benchmark series in January 1987. The US risk factors are obtained from Morningstar EnCorr. Default risk (bond default premium) is measured by the geometric difference between total returns on long-term corporate bonds and long-term government bonds. Term Structure risk (bond horizon premium) is measured by the geometric difference between Government Long Bond and Treasury Bill Returns. Inflation is based on the US consumer price index. R&D and sales data of

firms are from COMPUSTAT, with the S&P 600 Small Cap index used as the reference for compiling the small-cap company data. The business cycle peaks and troughs are based on the National Bureau of Economic Research (NBER) dates.

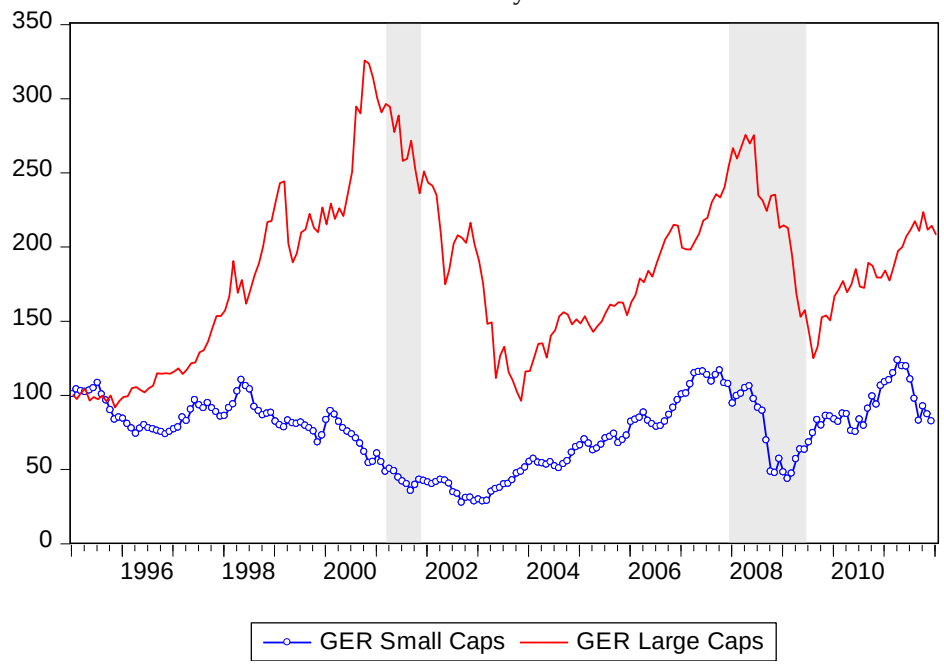
III. DIFFERENTIAL RETURNS AND INNOVATIVE EFFORTS FOR SMALL-CAPS AND LARGE CAPS ACROSS COUNTRIES

Figure 1 illustrates the differential returns for small-caps vs. large-caps for the G-7 countries. Recession intervals are highlighted with the grey shading of the graphs. Except for Germany, small caps outperformed for the sample holding period from January 1995-December 2011.

Figure 1
G-7 large cap vs. small cap stocks, January 1995 (=100) - December 2011
shaded areas indicate recessionary periods



Germany



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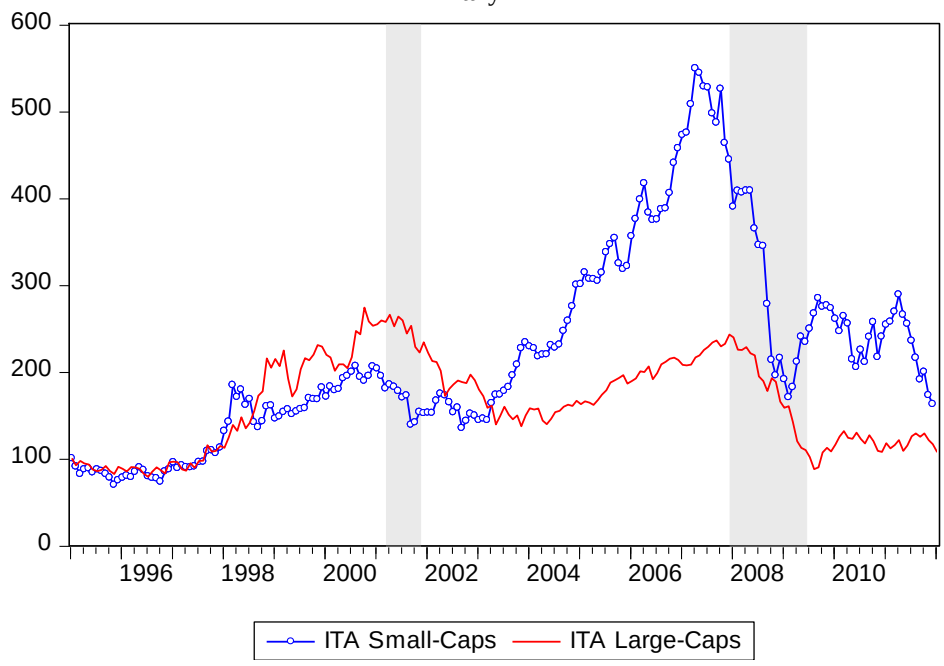
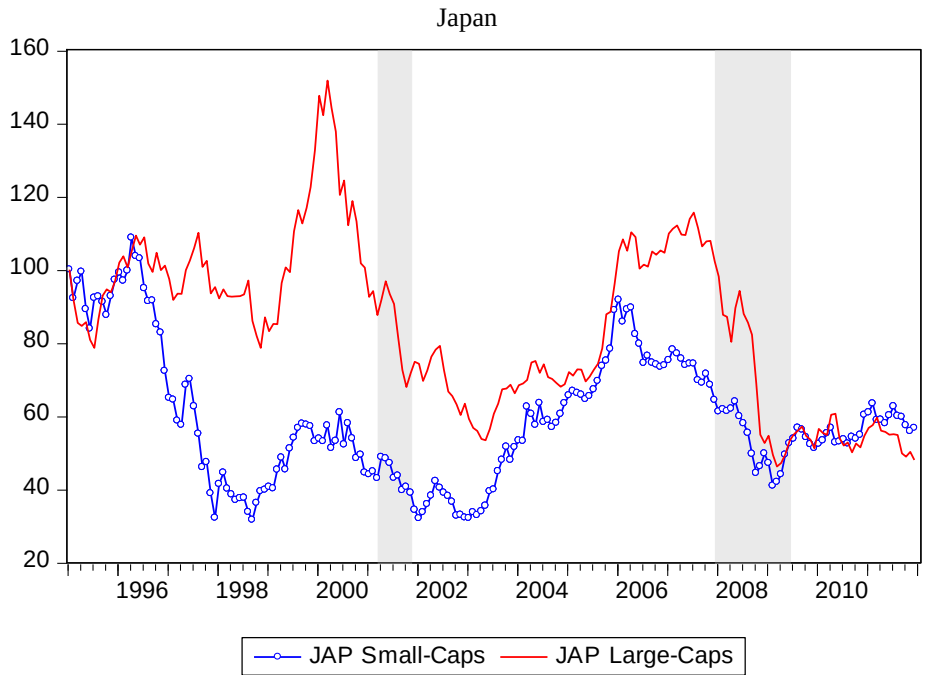
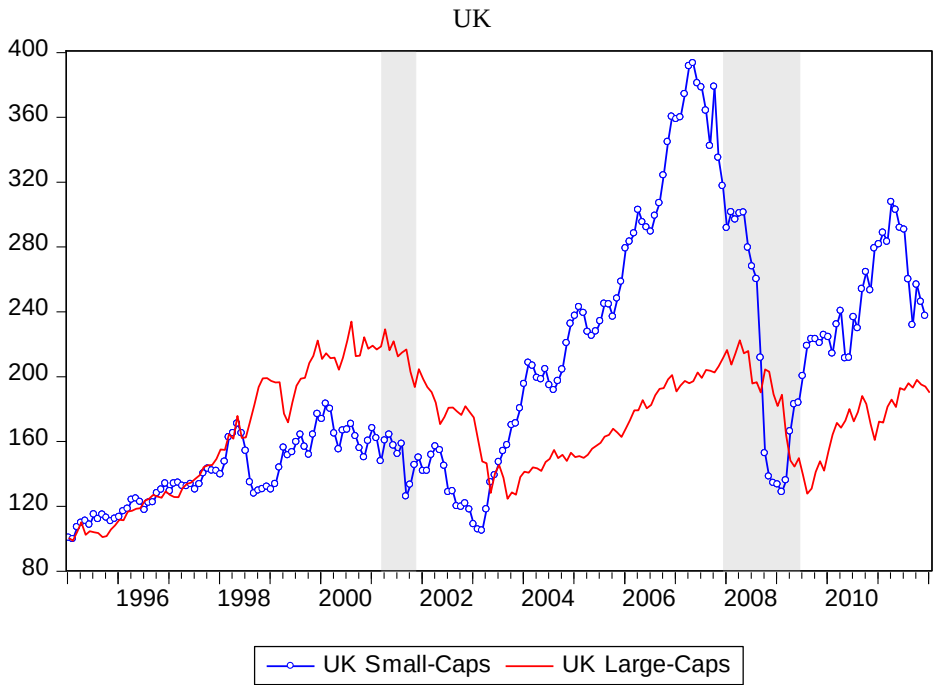
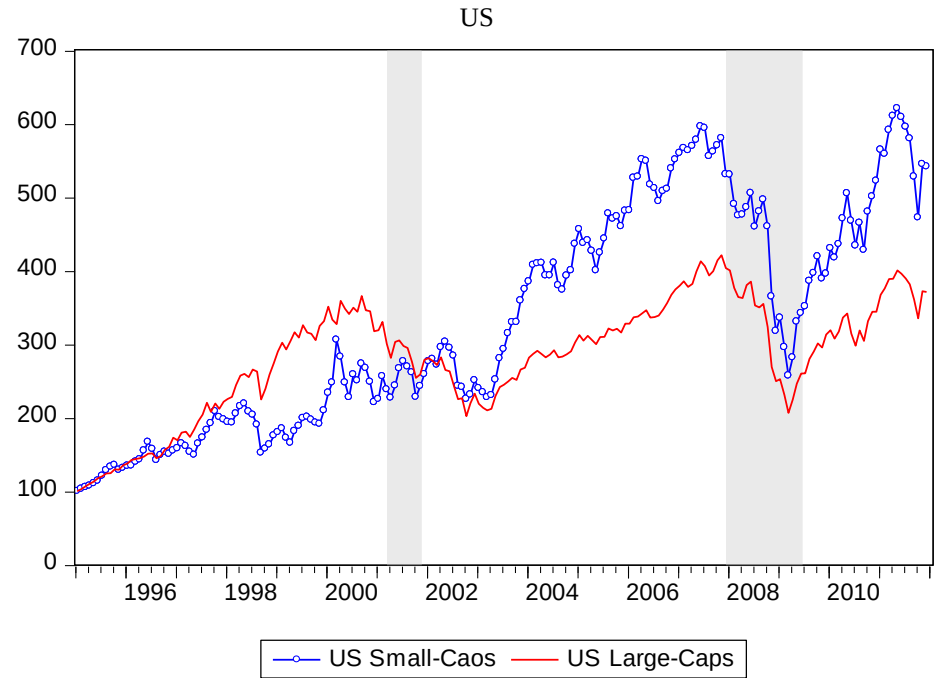



Japan
160
140
120
100
80
60
40
20
1996
1998
2000
2002
2004
2006
2008
2010
JAP Small-Caps
JAP Large-Caps


UK
400
360
320
280
240
200
160
120
80
1996
1998
2000
2002
2004
2006
2008
2010
UK Small-Caps
UK Large-Caps


US
700
600
500
400
300
200
100
0
1996
1998
2000
2002
2004
2006
2008
2010
US Small-Caos
US Large-Caps

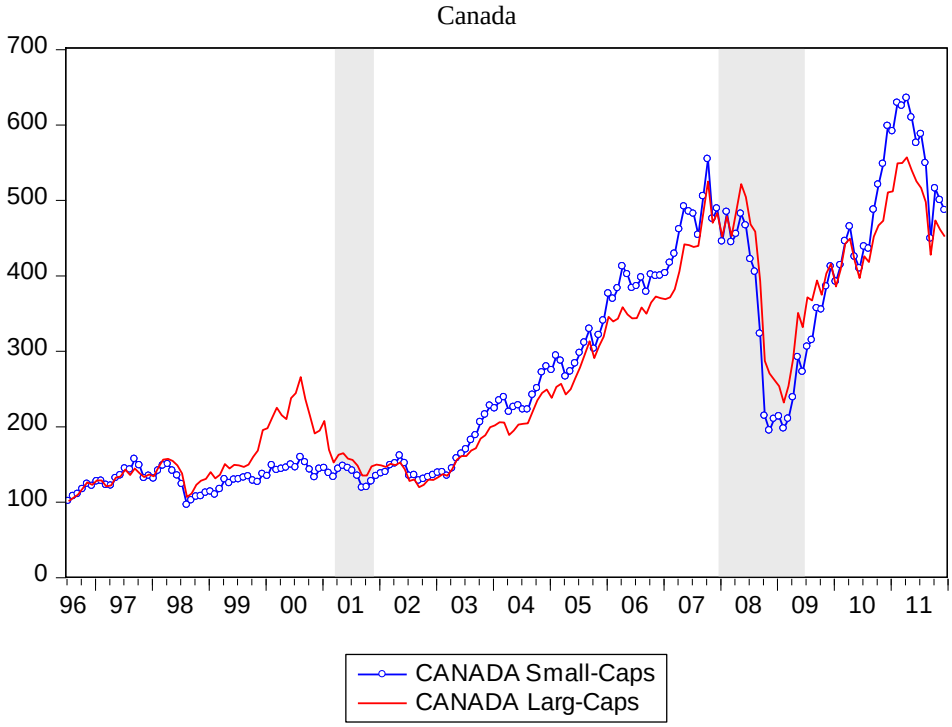

Canada
700
600
500
400
300
200
100
0
96
97
98
99
00
01
02
03
04
05
06
07
08
09
10
11
CANADA Small-Caps
CANADA Larg-Caps

Table 1 provides some descriptive statistics for the small-cap premia across G-7 countries. Again, with the exception of Germany, the average premia are positive over the sample period. We cannot reject the hypothesis of equality of means for these premia across countries.

Table 1
U.S. R&D intensity vs. stock market returns, 2000-2010

This table shows the R&D to sales ratio and annualized total stock returns (returns including dividends) for U.S. large cap vs. small Cap firms. S&P 500 Firms represent the Large-Cap Sector. The Small Cap Companies are from the S&P 600 Small-Cap Index. The data are from COMPUSTAT.

Panel A. Large Caps

Year	R&D/Sales	Annualized Return
2000	0.090786014	-0.0910
2001	0.091573332	-0.1189
2002	0.092031455	-0.2210
2003	0.093892787	0.2869
2004	0.077204206	0.1088
2005	0.073206480	0.0491
2006	0.084039733	0.1579
2007	0.077582268	0.0549
2008	0.080155903	-0.3700
2009	0.075663921	0.2646
2010	0.071601502	0.1506
Mean	0.082521600	0.0247
Median	0.080155903	0.0549
StdDev	0.008267989	0.2046

Panel B. Small Caps

Year	R&D/Sales	Annualized Return
2000	0.277975336	0.1180
2001	0.222472441	0.0654
2002	0.181341365	-0.1463
2003	0.240879096	0.3879
2004	0.093737142	0.2265
2005	0.103199740	0.0665
2006	0.116962567	0.1407
2007	0.124811868	-0.0122
2008	0.172236788	-0.3199
2009	0.169837676	0.2378
2010	0.119315386	0.2498
Mean	0.165706309	0.0922
Median	0.169837676	0.1180
StdDev	0.060884238	0.1984

Table 2 below shows the R&D intensity and stock market performance of US firms by market capitalization over the past decade. Large cap stocks are presented in Panel A, while small-caps are shown in Panel B. On average, the R&D to sales ratio of small caps is roughly doubles that of large caps. Furthermore, while there is considerable variation from year to year, the average performance of small caps is quite impressive. Note that both small caps and large did poorly during 2008, a recessionary year, while small caps performed relatively worse at the onset of the recession in 2007. Both groups appear to have reduced their R&D intensity since 2008, however.

Table 3 shows the G7, European Union, Asian, and MENA Small Cap Premia as well as the country aggregated R&D Expenditure as a Percentage of GDP for two most recent recessionary intervals, March 2001- November 2001 and December 2007-June 2009. It is evident that small caps do not perform well over recessionary periods. Japan, which is the country with the highest R&D intensity, is an exception to this trend.

On the whole, recoveries are beneficial for markets in general. They are especially propitious for small-caps.

Table 2
Descriptive statistics for monthly small cap premia, G-7 countries
Jan. 1995-December 2011

	Canada	France	Germany	Italy	Japan	UK	US
Mean	0.000749	-0.000608	-0.001859	0.000320	0.001137	0.001261	0.003461
Median	0.000326	1.71E-05	-0.002809	0.003666	0.002015	0.001999	0.001178
Maximum	0.139315	0.091470	0.144177	0.074924	0.140879	0.094272	0.259645
Minimum	-0.110480	-0.088943	-0.119634	-0.097419	-0.103263	-0.110141	-0.157520
Std. Dev.	0.034121	0.033778	0.037187	0.033142	0.032439	0.033961	0.044707
Skewness	-0.153227	0.069265	0.134850	-0.520449	0.107693	-0.194848	0.933342
Kurtosis	5.203032	3.137464	3.646435	3.101895	5.162743	3.811532	8.638182
Jarque-Bera	38.13516	0.293587	3.781836	8.431761	36.41301	6.247191	271.9007
Probability	0.000000	0.863472	0.150933	0.014759	0.000000	0.043999	0.000000
Sum	0.138562	-0.112486	-0.343871	0.059241	0.210398	0.233246	0.640357
Sum Sq. Dev.	0.214224	0.209931	0.254442	0.202100	0.193627	0.212211	0.367768

Test for Equality of Means Between the Premia			
Method	df	Value	Probability
Anova F-test	(6, 1288)	0.396301	0.8817
Welch F-test*	(6, 571.952)	0.320498	0.9263

*Test allows for unequal cell variances

Table 3
G7 small cap premium and R&D expenditure as a percentage of GDP[4] for recessionary periods

Country	March 2001 (Small Cap Premium/ R&D as % of GDP for 2001)		December 2007 (Small Cap Premium/R&D as % of GDP for 2007)	
France	4.65%	2.20%	-15.61%	2.08%
Germany	-8.01%	2.46%	-12.94%	2.53%
Italy	-3.57%	1.09%	-8.59%	1.18%
Japan	1.05%	3.12%	2.13%	NA
UK	0.62%	1.79%	-26.15%	1.78%
Canada	14.40%	2.09%	-16.54%	1.91%
US	23.57%	2.72%	-2.05%	2.67%
EU Small Cap	0.86%	1.86%[5]	-15.60%	1.85%
MSCI Asia	15.71%	1.01%[6]	-8.77%	1.26%[7]

IV. THE SMALL STOCK PREMIUM ANOMALY REVISITED

One of the oldest challenges to the efficient markets paradigm is the small firm (small-cap) anomaly (e.g., Banz, 1981; Reinganum, 1981a, 1981b; Siegel, 1998; Hawawini and Keim, 1999). Dimson and Marsh (1999) state that the striking outperformance of small cap companies is "the premier stock market anomaly" that is inconsistent with market efficiency. On the other hand, Bhardwaj and Brooks (1993), Horowitz et al (2000) and Schwert (2003) challenge the small-firm anomaly, Based on returns that extend to the 1982-2002 period, the latter concludes (2003, p. 943) the "small-firm anomaly has disappeared since the initial publication of the papers that discovered it." The issue of small stock outperformance remains a topic of debate across countries. Switzer and Fan (2007) show that the high returns to small caps may be country dependent, and demonstrate the benefits of adding Canadian small caps for international investors in enhancing their risk-return performance. More recently, Switzer (2010) shows that the small cap anomaly has re-appeared for most recent decade for US stocks.

Table 5 provides estimates of the Jensen (1968) alpha performance regression using the excess returns of the various small cap portfolios of this study (RS_t) over the risk free rate, proxied by the one month T-bill rate (RF_t) as the dependent variable; the independent variables consist of a constant and the excess of the CRSP value weighted portfolio of NYSE, AMEX and NASDAQ stocks benchmark market index (RM_t) over the one month treasury bill as the risk free rate (RF_t); ε is the random error term.

$$RS_t - RF_t = \alpha + \beta(RM_t - RF_t) + \varepsilon_t$$

The intercept of the regression measures the Jensen (1968) α, shows the difference between the monthly return of the small cap portfolio and the Capital Asset Pricing Model. It is evident that the small stock premium is only a North American phenomenon. In the post 2000 period it is not significant (at the 5% level) for the other G-7 countries of this study or for the MENA region.[8]

Table 4
G7 small cap premium including R&D expenditure as a percentage of GDP for recovery period

Country	November 2001 (Small Cap Premium/R&D as % of GDP for 2001)		June 2009 (Small Cap Premium/R&D as % of GDP for 2009)	
France	10.95%	2.20%	40.85%	2.23%
Germany	8.83%	2.46%	37.13%	2.82%
Italy	16.01%	1.09%	23.93%	1.27%
Japan	3.15%	3.12%	2.56%	NA
UK	9.73%	1.79%	29.48%	1.87%
Canada	18.36%	2.09%	26.34%	1.95%
US	10.36%	2.72%	9.04%	No Data
EU Small Cap	15.59%	1.86%	-3.23%	1.92%[9]

Table 5

Jensen (1968) alpha performance regressions for 2001:01-2011:12of the G-7 and. Small Company Portfolio (RS_t) using the CRSP value weighted portfolio of NYSE, AMEX and NASDAQ stocks (RM_t) as the benchmark market index, and the U.S. one month treasure bill as the risk free rate (RF_t); ε is the random error term. The intercept of the regression measures the Jensen (1968) alpha, shows the difference between the monthly return of the small cap portfolio and the Capital Asset Pricing Model: $RS_t - RF_t = \alpha + \beta(RM_t - RF_t) + \varepsilon_t$

	Estimated Coefficient		
	α	β	
France	0.0022	0.6089***	0.6685
t-statistic	0.6089	16.1390	
Germany	0.0025	1.3251***	0.7184
t-statistic	0.7348	18.2120	
Italy	-0.0001	1.0841***	0.5747
t-statistic	-0.2256	13.2550	
Japan	0.0024	0.4204***	0.1558
t-statistic	0.5840	14.8981	
UK	0.0033	1.0752***	0.6375
t-statistic	0.9662	15.1211	
US	0.0053**	1.1863***	0.8055
t-statistics	2.1700	23.2026	
Canada	0.0087**	1.1712***	0.5933
t-statistic	2.1362	13.7740	
MENA	0.0085	0.9552	0.3759
t-statistic	1.6374*	8.8500	

***, **, * indicate significance at .01 level, .05 level, and .10 level, respectively

V. BUSINESS CYCLE TURNING POINTS AND OTHERS RISK DETERMINANTS OF THE SMALL CAP PREMIUM

How does the small-cap premium behave over the business cycle for the countries of this study? Kim and Burnie (2002) assert that the small firm effect is only observed during business cycle expansions, and not contractions. However, they do not directly account for differential risk exposures that firms may face that have been postulated to be significant factors affecting the returns to firms (Chen, Roll, and Ross, 1986; Ferson and Harvey, 1991) and that may work apart from the state of the business cycle per se in affecting the return differential between large cap and small cap firms. Switzer (2010) looks at three such risk exposures: default risk (DEF), term structure risk (TERM), and inflation risk (INFLATION).[10] He shows that the small cap premium is significantly related to default risk in the economy, consistent with Vasilou and Xing (2004). While the term structure and inflation coefficients are positive, however, they are not significant, indicating that interest rate risk and inflation risk do not differentially affect small cap vs. large cap firms. Furthermore, in contrast with Kim and Burney (2002), recessions per se do not affect the US small firm return premium.

We extend this analysis herein for our international sample. Table 6 reports the results of regression tests for the period 1995:01-2011:12 of the model:

$$SML_t = \alpha_0 + \alpha_1 DEF_t + \alpha_2 TERM_t + \alpha_3 INFLATION_t + \sum_{i=1}^{2} \delta_i RECESSION_{it} + \varepsilon_t \quad (1)$$

where SML is the small cap premium, DEF is default risk (bond default premium), TERM is term structure (bond horizon risk), INFLATION is the monthly inflation rate (consumer price index), DUM_i is a dummy variable for the recession episode i, i=1,2, $RECESSION_i$ is a dummy variable for the recession episode i, i=1, 2; $RECESSION_1$ - 2001 Recession; $RECESSION_2$ - 2007-09 Recession; ε_i is a random error term.

Table 6
Results of regression tests for the period 1995:01-2011:12 of Equation (1)

Panel A. : Canada

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003053	0.003161	0.965553	0.3356
RECESSION2001	0.002357	0.011554	0.203964	0.8386
RECESSION2007	-0.009811	0.008184	-1.198803	0.2322
DEFAULTRISK	0.359586	0.150910	2.382783	0.0182
TERMRISK	-0.026729	0.093084	-0.287147	0.7743
INFLATION	-0.577858	0.694736	-0.831767	0.4066

R-squared	0.056538	Mean dependent var.	0.000749
Adjusted R-squared	0.030184	S.D. dependent var.	0.034121
S.E. of regression	0.033602	Akaike info criterion	-3.916547
Sum squared resid	0.202112	Schwarz criterion	-3.812103
Log likelihood	368.2806	Hannan-Quinn criter.	-3.874218
F-statistic	2.145344	Durbin-Watson stat.	1.729828
Prob(F-statistic)	0.062146		

Panel B: France

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003020	0.003172	-0.952126	0.3423
RECESSION2001	-0.002682	0.011591	-0.231397	0.8173
RECESSION2007	-0.004189	0.008210	-0.510216	0.6105
DEFAULTRISK	0.226103	0.151393	1.493490	0.1371
TERMRISK	0.074464	0.093381	0.797418	0.4263
INFLATION	1.346015	0.696957	1.931275	0.0550

R-squared	0.031083	Mean dependent var.	-0.000608
Adjusted R-squared	0.004018	S.D. dependent var.	0.033778
S.E. of regression	0.033710	Akaike info criterion	-3.910164
Sum squared resid	0.203406	Schwarz criterion	-3.805720
Log likelihood	367.6902	Hannan-Quinn criter.	-3.867836
F-statistic	1.148464	Durbin-Watson stat.	2.097857
Prob(F-statistic)	0.336594		

Pane: C: Germany

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005435	0.003491	-1.556658	0.1213
RECESSION2001	-0.008490	0.012760	-0.665344	0.5067
RECESSION2007	0.006221	0.009038	0.688302	0.4922
DEFAULTRISK	0.114128	0.166655	0.684815	0.4943
TERMRISK	0.194915	0.102795	1.896142	0.0596
INFLATION	1.195005	0.767218	1.557582	0.1211

R-squared	0.031273	Mean dependent var.	-0.001859
Adjusted R-squared	0.004213	S.D. dependent var.	0.037187
S.E. of regression	0.037108	Akaike info criterion	-3.718068
Sum squared resid	0.246485	Schwarz criterion	-3.613624
Log likelihood	349.9213	Hannan-Quinn criter.	-3.675739
F-statistic	1.155700	Durbin-Watson stat.	2.152796
Prob(F-statistic)	0.332909		

Panel D: Italy

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003911	0.003112	-1.256837	0.2105
RECESSION2001	-0.000107	0.011372	-0.009448	0.9925
RECESSION2007	0.007088	0.008055	0.879942	0.3801
DEFAULTRISK	0.052521	0.148529	0.353607	0.7240
TERMRISK	0.101049	0.091615	1.102972	0.2715
INFLATION	1.514953	0.683775	2.215572	0.0280

R-squared	0.031247	Mean dependent var.	0.000320
Adjusted R-squared	0.004186	S.D. dependent var.	0.033142
S.E. of regression	0.033072	Akaike info criterion	-3.948352
Sum squared resid	0.195785	Schwarz criterion	-3.843908
Log likelihood	371.2226	Hannan-Quinn criter.	-3.906024
F-statistic	1.154708	Durbin-Watson stat.	1.938293
Prob(F-statistic)	0.333413		

Panel E: Japan

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.003067	0.002994	-1.024383	0.3070
RECESSION2001	0.012900	0.010942	1.178991	0.2400
RECESSION2007	0.008576	0.007750	1.106541	0.2700
DEFAULTRISK	-0.182347	0.142908	-1.275977	0.2036
TERMRISK	0.164464	0.088148	1.865771	0.0637
INFLATION	0.891930	0.657894	1.355735	0.1769

R-squared	0.063948	Mean dependent var.	0.001137
Adjusted R-squared	0.037801	S.D. dependent var.	0.032439
S.E. of regression	0.031820	Akaike info criterion	-4.025522
Sum squared resid	0.181245	Schwarz criterion	-3.921078
Log likelihood	378.3608	Hannan-Quinn criter.	-3.983193
F-statistic	2.445741	Durbin-Watson stat.	2.007254
Prob(F-statistic)	0.035797		

Panel F: UK

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000532	0.003177	-0.167551	0.8671
RECESSION2001	-0.001964	0.011611	-0.169147	0.8659
RECESSION2007	0.000889	0.008224	0.108103	0.9140
DEFAULTRISK	0.318161	0.151653	2.097955	0.0373
TERMRISK	0.010076	0.093542	0.107711	0.9143
INFLATION	0.939981	0.698156	1.346378	0.1799

R-squared	0.038191	Mean dependent var.	0.001261
Adjusted R-squared	0.011325	S.D. dependent var.	0.033961
S.E. of regression	0.033768	Akaike info criterion	-3.906726
Sum squared resid	0.204107	Schwarz criterion	-3.802282
Log likelihood	367.3722	Hannan-Quinn criter.	-3.864398
F-statistic	1.421543	Durbin-Watson stat.	1.839660
Prob(F-statistic)	0.218547		

Panel G: US

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002143	0.004174	0.513421	0.6083
RECESSION2001	0.014742	0.015254	0.966419	0.3351
RECESSION2007	-9.65E-05	0.010804	-0.008933	0.9929
DEFAULTRISK	0.384470	0.199235	1.929733	0.0552
TERMRISK	-0.061367	0.122891	-0.499363	0.6181
INFLATION	0.542567	0.917203	0.591545	0.5549

R-squared	0.042122	Mean dependent var.	0.003461
Adjusted R-squared	0.015365	S.D. dependent var.	0.044707
S.E. of regression	0.044362	Akaike info criterion	-3.360952
Sum squared resid	0.352277	Schwarz criterion	-3.256508
Log likelihood	316.8880	Hannan-Quinn criter.	-3.318623
F-statistic	1.574266	Durbin-Watson stat.	1.904700
Prob(F-statistic)	0.169536		

Panel H: MENA (Middle East and North African) Countries

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003473	0.003090	1.123962	0.2625
RECESSION2001	-0.005490	0.011294	-0.486082	0.6275
RECESSION2007	-0.011010	0.008000	-1.376258	0.1705
DEFAULTRISK	0.135260	0.147517	0.916910	0.3604
TERMRISK	-0.105112	0.090991	-1.155195	0.2496
INFLATION	-0.148641	0.679115	-0.218875	0.8270

R-squared	0.032845	Mean dependent var.	0.001179
Adjusted R-squared	0.005829	S.D. dependent var.	0.032943
S.E. of regression	0.032847	Akaike info criterion	-3.962031
Sum squared resid	0.193125	Schwarz criterion	-3.857587
Log likelihood	372.4878	Hannan-Quinn criter.	-3.919702
F-statistic	1.215765	Durbin-Watson stat.	1.896102
Prob(F-statistic)	0.303535		

Overall, the results are quite different, by country and region. Inflation risk is priced in both France and Italy. Mild term structure risk is found in Germany and Japan. Default risk is significant in North American markets and the UK. Default risk, which may be tied to innovative investments, is not priced in non-common law settings, where protection of shareholders and creditors in bankruptcy states is limited. This result is consistent with La Porta et al. (1998). The recession dummy variables are not significant for any of the countries These factors are distinct from business cycle turning points per se, which are not found to be significant. It should be noted that these conclusions also hold when we use the OECD recession dates for each country, as well as country specific measures of default risk, term-structure risk, and inflation risk. The detailed results using these alternative variables are available on request.

VI. CONCLUSION

This paper provides a new look at the small cap premium in international markets. Since 2000, economically and statistically significant abnormal returns are observed for small cap stocks in North America, but not in other G-7 countries or in the MENA region. Size based asset portfolios are found to be associated with risk factors that differ across countries. These factors are distinct from business cycle turning points per se, which are not found to be significant.

A more in-depth analysis of the links between default risk, innovation, and performance across asset classes remains a topic for future research. The factors that drive innovation and differential performance across asset size classes should be of considerable interest for investors looking to benefit from time-varying asset allocation strategies (see, e.g., Arshanapalli, Switzer, and Panju (2007)).

ENDNOTES

1. According to the U.S. Small Business Administration, small firms:
   - "Represent 99.7 percent of all employer firms.
   - Employ about half of all private sector employees.
   - Pay nearly 45 percent of total U.S. private payroll.
   - Have generated 60 to 80 percent of net new jobs annually over the last decade.
   - Create more than half of nonfarm private gross domestic product (GDP).
   - Hire 40 percent of high tech workers (such as scientists, engineers, and computer workers).
   - Made up 97.3 percent of all identified exporters and produced 28.9 percent of the known export value in FY 2006.
   - Produce 13 times more patents per employee than large patenting firms; these patents are twice as likely as large firm patents to be among the one percent most cited." See http://web.sba.gov/faqs/faqindex.cfm?areaID=24
2. See, e.g., Schwert (1990) and Fama and French (1995), and Switzer and Tang (2009). Moscarini and Postel-Vinay (2009) suggest that the small cap premium is linked to job creation: large employers destroy proportionally more jobs during and immediately after recessions occur, and create proportionally more jobs late in expansions, relative to small employers. This differential is also shown to explain in part the superior performance of US small cap firms during recoveries (Moscarini and Postel-Vinay (2010)).
3. An analyst in the *Financial Times* (Handy Caps, May 26, 2009, p12 states: "The final stages of a boom, though, are an inauspicious time to own small companies. As the economy slows, they are often the first to feel the pinch: small businesses tend to be biased towards cyclical industries and mostly do not have the luxury of international diversification. Also, as bull markets near their apex, inflows from naïve retail investors may be concentrated in the largest, most liquid shares. True to form, small caps began to underperform the broader US market just as the housing bubble peaked. From April 2006 to the end of 2008, they shed 32 per cent of their value compared with just 24 per cent for large stocks. Conversely, much of small stocks' historical edge comes from outperforming early in any recovery….."
4. UNESCO Institure for Statistics, Beyond 20/20 WDS, 2012, 27 January 2012 <http://stats.uis.unesco.org/unesco/TableViewer/tableView.aspx>.
5. http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/9-08092009-AP/EN/9-08092009-AP-EN.PDF
6. This estimate excludes Malaysia, Taiwan, and the Philippines due to the lack of available data.
7. This estimate excludes Malaysia, Taiwan, and Indonesia due to the lack of available data.
8. The Jensen alpha is only significant for MENA countries at the 10% level.
9. http://www.oecd-ilibrary.org/sites/rdxp-table-2011-1-en/index.html;jsessionid=9u933p450d7f.delta?contentType=/ns/KeyTable,/ns/StatisticalPublication&itemId=/content/table/2075843x-table1&containerItemId=/content/tablecollection/2075843x&accessItemIds=&mimeType=text/html
10. Default risk or the bond default premium, is measured by the long term corporate

to government yield spreads (DEF). A positive default risk premium is consistent with investors' desire to hedge against unanticipated increases in the aggregate risk premium induced by an increase in uncertainty in the economy (Ferson and Harvey, 1991). In Fama and French (1995) the small firm premium is a proxy for a default risk state variable. Vasilou and Xing (2004) show that default risk does affect the Fama and French (1995) size and book to market factors. Beck and Demirguc-Kunt (2006) assert that small and medium size firms are more exposed to default risk due to their lack of capital and liquidity compared to large firms. A rising term reflects an increase in riskiness of longer term assets, To the extent that small cap firms bear a distinct risk premium, this priced to the extent that investors require a higher premium to hold risky assets when the term structure becomes steeper. Inflation risk has been attributed as a significant factor in adversely affecting stock returns, and in the asset allocation (e.g., Fama, 1981; Boudoukh and Richardson, 1993; Bekaert, 2009; Katzur and Spierdijk, 2010). To the extent that small firms operate in more competitive environments, they may have less pricing power than larger firms, and hence may be more exposed to inflation risk, and hence command an inflation premium relative to larger firms.

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