**/\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*/**

**/\* \*\*\*\*\*\*\*\*\* W R D S R E S E A R C H A P P L I C A T I O N S \*\*\*\*\*\*\*\*\*\*\*\*\* \*/**

**/\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*/**

**/\* Program : market\_to\_book.sas \*/**

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**/\* Date Created : Aug 2011 \*/**

**/\* Last Modified: Aug 2011 \*/**

**/\* \*/**

**/\* Description : Calculate Raw and Industry Adjusted Market-to-Book Ratio \*/**

**/\* using separately Compustat only and CRSP-Compustat Merged \*/**

**/\* Compares the coverage, compute industry-level M/B ratios as \*/**

**/\* well as industry-adjusted M/B at the company level \*/**

**/\* Output : The output table INDADJMB contains firm-level raw M/B Ratios\*/**

**/\* using both approaches as well as their industry-adjusted \*/**

**/\* counterparts \*/**

**/\* \*/**

**/\* Notes : The program is based on a book-equity definition used by \*/**

**/\* Daniel and Titman in their "Market Reactions to Tangible \*/**

**/\* and Intangible Information" (Journal of Finance, 2006). \*/**

**/\* RA focuses on US companies, but can be extended to include \*/**

**/\* Canadian and international companies \*/**

**/\* \*/**

**/\* Compustat Xpressfeed Total Liabilities(LT) no longer include\*/**

**/\* the minority interest (MIB).Therefore, the new balance sheet\*/**

**/\* equation Total Assets (AT) = Total Liabilities (LT) + \*/**

**/\* Minority Interest (MIB) + Stockholders? Equity (SEQ) \*/**

**/\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*/**

**/\* Calculating Market-to-Book using Compustat only \*/**

**/\* Advantage: captures many firms that are in Compustat, but not in CRSP \*/**

**%let** bdate=01jan1962; **%let** edate=31dec2010;

**%let** comp=comp;

**%let** crsp=crsp;

**/\* Standard Compustat Filter\*/**

**%let** comp\_filter=consol='C' and indfmt='INDL' and datafmt='STD' and popsrc='D';

**%let** ind=10; **\*number of FF industries for which to compute median M/B ratio;**

**/\* Step 1. Create Book Equity (BE) measure \*/**

**/\* CSHO is a company level item and includes all classes of common stock \*/**

**/\* prcc\_c is the price as of Dec of the FISCAL year. So, for instance, if a \*/**

**/\* company's fiscal year end falls b/w jan and may 1990, then prcc\_c will be \*/**

**/\* the Dec end price as of Dec 1989. However, if the fiscal year end falls b/w \*/**

**/\* june and dec 1990, then prcc\_c will be the price as of Dec 1990 \*/**

**data** comp\_extract/**view**=comp\_extract; **set** &comp.**.f**unda;

**where** (at>**0** or not missing(sale)) and &comp\_filter and fic='USA';

calyear=year(datadate);

mcap\_c=prcc\_c\*csho; **/\*Market Value of Equity at Dec end of fiscal year t \*/**

**/\*to obtain shareholders equity, use stockholders equity, if not missing \*/**

**if** not missing(SEQ) **then** SHE=SEQ;**else**

**/\*if SEQ missing, use Total Common Equity plus Preferred Stock Par Value \*/**

**if** nmiss(CEQ,PSTK)=**0** **then** SHE=CEQ+PSTK;**else**

**/\*if CEQ or PSTK is missing, use \*/**

**/\*Total Assets-(Total Liabilities+Minority Interest), if all exist \*/**

**if** nmiss(AT,LT)=**0** **then** SHE=AT-sum(LT,MIB);

**else** SHE=**.**;

**/\*to obtain book equity,subtract from the shareholders' equity the preferred\*/**

**/\*stock value,using redemption,liquididating or carrying value in that order\*/**

**/\*if available\*/**

PS = coalesce(PSTKRV,PSTKL,PSTK,**0**);

BE0 = SHE-PS;

**/\* Accounting data since calendar year 't-1'\*/**

**if** year(**"&bdate"d**) - **1**<=calyear<=year(**"&edate"d**) + **1**;

**keep** gvkey calyear fyr fyear BE0 indfmt consol mcap\_c sich

datafmt popsrc datadate TXDITC prcc\_f prcc\_c curcd;

**run**;

**/\* Finally, if not missing, add balance sheet deferred taxes and \*/**

**/\* subtract off the FASB106 adjustment \*/**

**proc** **sql**; **create** **table** comp\_be

**as** **select**

a.gvkey, a.calyear, a.fyr, a.datadate, a.fyear, a.mcap\_c,

a.prcc\_f, a.prcc\_c, sum(a.BE0,a.TXDITC,-b.PRBA) **as** BE,a.curcd, a.sich

**from** comp\_extract a **left** **join**

&comp.**.a**co\_pnfnda (**where**=(&comp\_filter)) b

**on** a.gvkey=b.gvkey **and** a.datadate=b.datadate;

**quit**;

**/\* Step 2: calculate the market value as of Dec end \*/**

**/\* Curcdm is the currency in which the monthly prices are available \*/**

**/\* Primiss='P' is the primary issue with the highest average trading\*/**

**/\* volume over a period of time \*/**

**data** mvalue/**view**=mvalue; **set** &comp.**.s**ecm;

**where** month(datadate)=**12** and primiss='P' and fic='USA'

and **"&bdate"d**<=datadate<=**"&edate"d**;

mcap\_dec=prccm\*cshoq;

**rename** prccm=prc\_dec;

**keep** gvkey datadate prccm curcdm mcap\_dec;

**run**;

**/\* Step 3a. Create Book to Market (BM) ratios using Compustat only \*/**

**/\* This step is needed, because sometimes PRCC\_C or CSHO is missing \*/**

**/\* in Compustat Fundamentals Annual dataset, so bring December market\*/**

**/\* value calculated from Compustat Security file \*/**

**/\* BE- book equity reported in fiscal year t \*/**

**/\* MCAP - market equity as of Dec of fiscal year t if available \*/**

**/\* Coalesce function returns the first non-missing value for the M/B \*/**

**/\* the order of the listed arguments \*/**

**/\* MB\_COMP contains the M/B ratios for the entire Compustat Universe \*/**

**proc** **sql**; **create** **table** mb\_comp

**as** **select** a.gvkey, a.datadate **format** date9., a.calyear, a.fyear,

a.prcc\_f, a.prcc\_c,b.prc\_dec, a.curcd, a.sich,

a.be, a.mcap\_c, b.mcap\_dec, mdy(**12**,**31**,a.fyear) **as** fyear\_end,

coalesce(mcap\_c/((be>**0**)\*be),mcap\_dec/((be>**0**)\*be)) **as** mb\_comp

**from** comp\_be a **left** **join** mvalue b

**on** a.gvkey=b.gvkey **and** a.fyear=year(b.datadate) **and** a.curcd=b.curcdm

**order** **by** a.gvkey, a.datadate;

**quit**;

**/\* Step 3b. Alternatively, one can use Market value from CRSP as of \*/**

**/\* Dec end of fiscal year. Note that this will restrict the sample \*/**

**/\* to CRSP stocks only \*/**

**/\* Select Compustat's SICH as primary SIC code, if not available \*/**

**/\* then use CRSP's historical SICCD \*/**

**proc** **sql**; **create** **table** mb\_comp\_crsp

**as** **select** a.\*, b.lpermno **as** permno, b.lpermco **as** permco,

abs(c.prc\*c.shrout)/(**1000**\*(a.be>**0**)\*a.be) **as** mb\_crsp,

coalesce(a.sich,d.siccd) **as** sic

**from** mb\_comp a **left** **join** &crsp.**.c**cmxpf\_linktable b

**on** a.gvkey=b.gvkey **and** b.linkdt<=a.datadate **and** b.usedflag=**1**

**and** linkprim **in** ('P','C')

**and** (a.datadate<=b.linkenddt or missing(b.linkenddt))

**/\* market value from CRSP as the Dec end of fiscal year end\*/**

**left** **join** &crsp.**.m**sf (keep=permno date prc shrout) c

**on** b.lpermno=c.permno **and** put(a.fyear\_end,yymmn6.)=put(c.date,yymmn6.)

**/\*Merge in historical SIC code from CRSP\*/**

**left** **join** (**select** **distinct** permno, siccd, min(namedt) **as** mindate,

max(nameenddt) **as** maxdate

**from** &crsp.**.s**tocknames **group** **by** permno, siccd) d

**on** b.lpermno=d.permno **and** d.mindate<=a.fyear\_end<=d.maxdate

**order** **by** a.gvkey, a.datadate, sic;

**quit**;

**/\* Step 4. Invoke FF industry classification \*/**

**/\* MB\_COMP\_CRSP contains M/B ratios based on "Compustat only" \*/**

**/\* and CRSP-Compustat Merged database \*/**

**data** mb\_comp\_crsp; **set** mb\_comp\_crsp;

**by** gvkey datadate;

**if** last.datadate; **/\*selects the record with non-zero SIC code\*/**

%***ffi***&ind(sic);

**run**;

**/\*trimming extreme values of Market-To-Book within industries\*/**

**proc** **sort** **data**=mb\_comp\_crsp;

**by** calyear ffi&ind.\_desc;

**run**;

**proc** **rank** **data**=mb\_comp\_crsp **out**=mb\_comp\_crsp **groups**=**100**;

**by** calyear ffi&ind.\_desc; **var** mb\_comp mb\_crsp;

**ranks** rmb\_comp rmb\_crsp;

**run**;

**data** mb\_comp\_crsp; **set** mb\_comp\_crsp;

**if** rmb\_comp=**99** **then** mb\_comp=**.**;

**if** rmb\_crsp=**99** **then** mb\_crsp=**.**;

**run**;

**/\* Step 6. Number of distinct companies with non-missing M/B**

**/\* based on Compustat only and based on Crsp-Compustat products\*/**

**proc** **sql**;

**create** **table** mbcomp

**as** **select** **distinct** calyear,ffi&ind.\_desc,

count(**distinct** gvkey) **as** ngvkeys

**from** mb\_comp\_crsp **where** **not** missing(mb\_comp) **and** curcd='USD'

**group** **by** calyear, ffi&ind.\_desc;

**create** **table** mbcrsp

**as** **select** **distinct** calyear,ffi&ind.\_desc,

count(**distinct** permco) **as** npermnos

**from** mb\_comp\_crsp **where** **not** missing(mb\_crsp) **and** curcd='USD'

**group** **by** calyear, ffi&ind.\_desc;

**quit**;

**data** comparembcov;

**merge** mbcomp mbcrsp;

**by** calyear ffi&ind.\_desc;

diff=(ngvkeys-npermnos)/npermnos;

**format** diff percent7.4;

**if** **1980**<=calyear<=**2010**;

**run**;

**proc** **transpose** **data**=comparembcov **out**=comparembcov

(drop=\_name\_ **label**='Comparing Market-to-Book coverage between two methods');

**by** calyear; **id** ffi&ind.\_desc;

**var** diff;

**run**;

**/\*Step 7. M/B ratios for different FF industries over time\*/**

**/\*Step 8. Industry-adjusted M/B ratios at the firm-year level\*/**

**proc** **means** **data**=mb\_comp\_crsp **noprint**;

**class** calyear ffi&ind.\_desc;

**var** mb\_comp mb\_crsp; **where** not missing(ffi&ind);

**output** **out**=medians **median**=/**autoname**;

**run**;

**proc** **sort** **data**=medians; **by** calyear ffi&ind.\_desc;**run**;

**proc** **transpose** **data**=medians **out**=temp

(**label**="Median Market-to-Book ratios for &ind FF industries");

**by** calyear; **id** ffi&ind.\_desc;

**where** **1970**<=calyear<=**2010**;

**var** mb\_comp\_median;

**run**;

**options** **orientation**=landscape **device**=pdf;

**symbol1** **interpol** =join **ci** =green **co** =green **w** = **3** ;

**symbol2** **interpol** =join **ci** =blue **co** =blue **w**=**3**;

**symbol3** **interpol** =join **ci** =red **co** =red **w**=**3**;

**proc** **gplot** **data** =temp;

**Title** 'Median M/B ratios of sample industries' ;

**plot** hitec\*calyear= **1** hlth\*calyear= **2** manuf\*calyear=**3**/ **overlay** legend ;

**run**; **quit**;

**/\* Take out the industry component \*/**

**/\* INDADJMB contains the firm-level raw and industry-adjusted \*/**

**/\* Market-to-Book ratios calculated using Compustat Only \*/**

**/\* as well as CRSP-Compustat Merged Product \*/**

**data** indadjmb; **merge** mb\_comp\_crsp medians;

**by** calyear ffi&ind.\_desc;

mb\_comp\_indadj=mb\_comp-mb\_comp\_median;

mb\_crsp\_indadj=mb\_crsp-mb\_crsp\_median;

**if** missing(ffi&ind.\_desc) **then** **do**;

mb\_comp\_indadj=**.**;mb\_crsp\_indadj=**.**;**end**;

**keep** gvkey datadate permco permno fyear calyear mb\_comp mb\_crsp;

**keep** mb\_comp\_indadj mb\_crsp\_indadj ffi&ind.\_desc sic;

**label** calyear='Calendar year of the fiscal period end'

mb\_comp='M/B ratio (Compustat Only)'

mb\_crsp='M/B ratio (CRSP-Compustat Merged)'

mb\_comp\_indadj='Industry-adjusted M/B ratio (Compustat Only)'

mb\_crsp\_indadj='Industry-adjusted M/B ratio (CRSP-Compustat Merged')

sic='Historical SIC code';

**if** not missing(gvkey);

**run**;

**/\* Clean the house\*/**

**proc** **sql**;

**drop** **table** comparembcov, comp\_be, mbcomp, mbcrsp,mb\_comp,

mb\_comp\_crsp, medians, temp

**view** comp\_extract, mvalue;

**quit**;

**/\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*/**

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