



Center for Entrepreneurial and Financial Studies

**DAXplus Family
Construction and Analysis of a Family Firm Index**

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Agenda

1. Construction of a Family Index

- Motivation: Construction of a Family Index
- Definition of Listed Family Firms
- Number of Family Firms in the Prime Standard
- Characteristics of Family Firms
 - Market Capitalisation
 - Industry Classification
 - Family Influence

2. Analysis of the Family Index

- Composition of New Family Indices
 - Extent of Concentration
 - Sector Weightings
- Source of Information, Benchmark and Investment Function
 - Index Performance, Return and Risk
 - Distribution and Correlation of Returns
 - Liquidity

3. Summary and Outlook

Characteristics Associated with Family Firms

Family firm(s)...

- represent an **important part** of the **German economy**
- are more **long-term oriented** than other firms
- have a distinct **corporate governance mechanism** that **mitigates agency conflicts** or that even **prevents** those **conflicts**
(**alignment of interest** between owners and management)
- **owners** have a **keen interest in preserving** family **reputation** and family **wealth**
- show **healthy capital structures**

Definition of Listed Family Firms

Adjusted Founding-Family-Definition⁽¹⁾

A company qualifies as a **family firm**, if

- a) the **founding family** holds **at least 25%** of all **ordinary shares** of the company (*family ownership*)

or

- b) a **member** of the **founding family** is in the **supervisory** or **management board** (*family management*) and the respective **founding family** holds at least **5%** of all **ordinary shares**

⁽¹⁾ Our family firm definition is based on existing scholarly work (cf. Stiftung Familienunternehmen/CEFS (2009), Anderson/Reeb 2003, Villalonga/Amit 2006), but also considers the concentrated structures of ownership in Germany and legal regulations on the blocking minority (25%). Also cf. Andres (2007, 2008) for Germany or Sraer/Thesmar (2006) for France.

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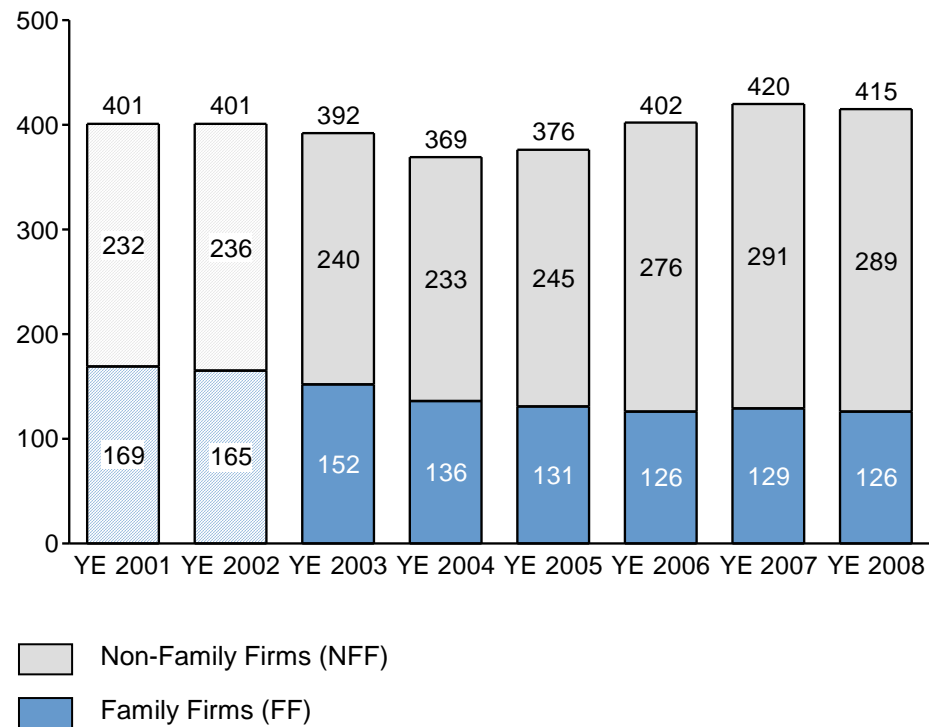
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3. Summary and Outlook

Number of Family Firms in the Prime Standard

Number of Family Firms vs. Non-Family Firms (Prime Standard, 2001 – 2008)⁽¹⁾

Number of Family-/Non-Family-Firms p.a.



YE =Year End

⁽¹⁾ Basis: Prime Standard 2001-2008 and Hoppenstedt Aktienführer; the Prime Standard composition 2001 and 2002 are approximated on the basis of the first composition on 23/03/2003.

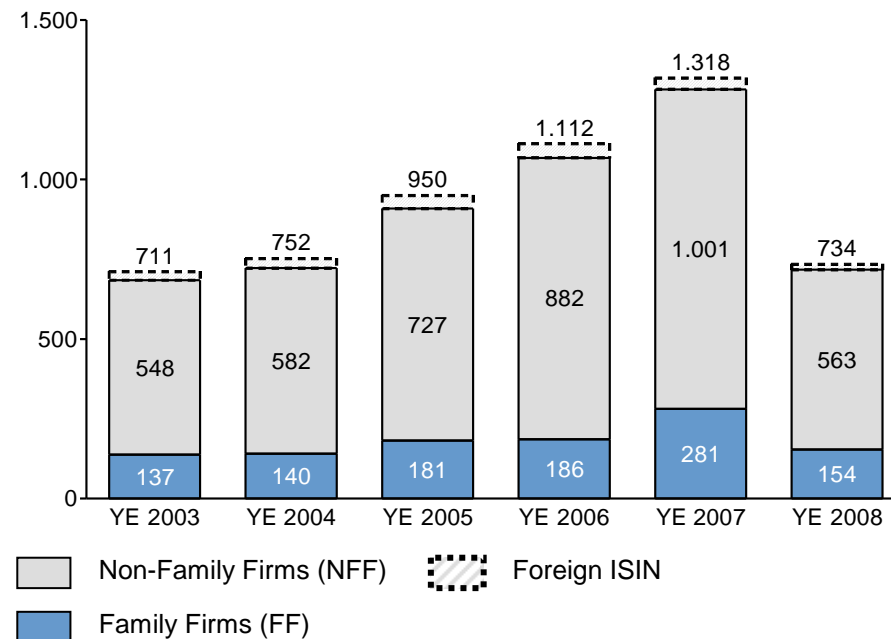
- This analysis considers **all stocks** - industrial as well as financial companies - listed in the Prime Standard
- Period of analysis comprises the years **2001 to 2008**
- Ownership data is **updated on a year end basis**
- Family Firm selection represents **German companies** (German ISIN) and **ordinary shares** (no preferred stock)
- Main source of ownership data is **Hoppenstedt Aktienführer**

(Source: TUM Research)

Market Capitalisation of Family Firms in the Prime Standard

Market Capitalisation of FF vs. NFF (Prime Standard, 2003-2008)⁽¹⁾

Market Capitalisation in Billion Euro

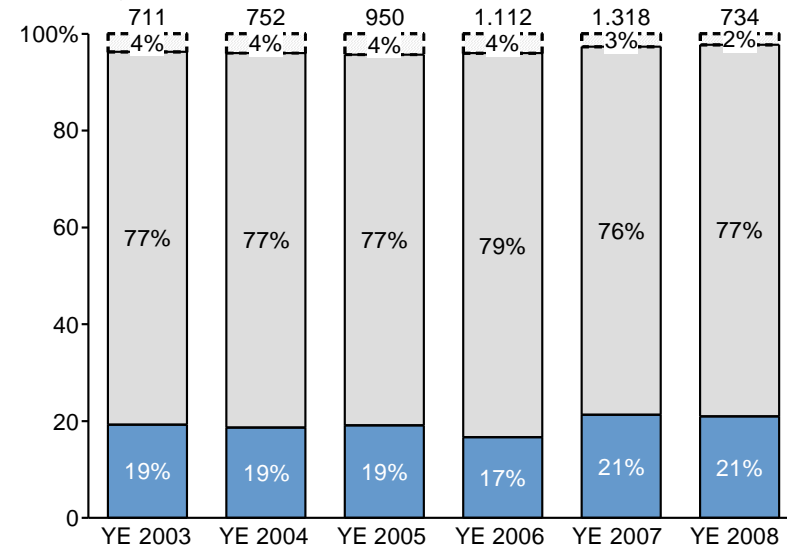


YE =Year End

⁽¹⁾ Basis: Prime Standard 2003-2008 and Hopenstedt Aktienführer. Total Market Capitalisation Prime Standard including companies with foreign ISINs.

% of Total Market Capitalisation of FF vs. NFF (Prime Standard, 2003-2008)⁽¹⁾

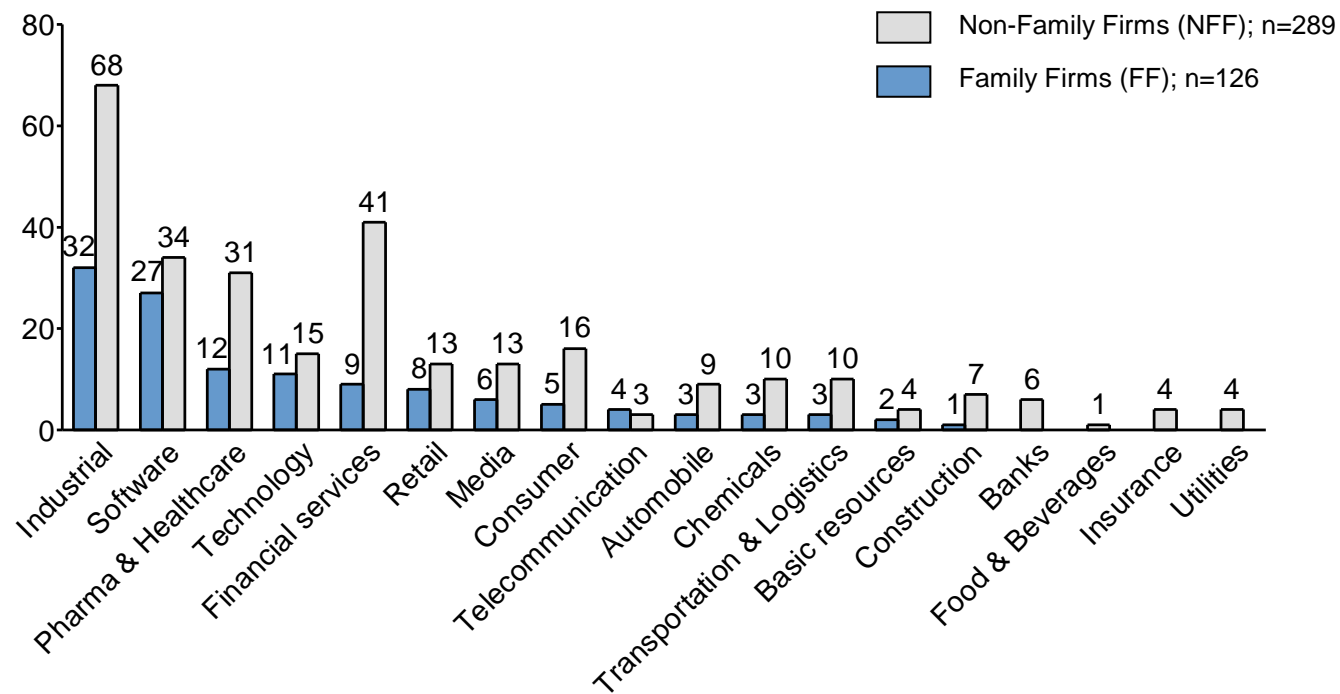
Percentage of Total Prime Standard Market Capitalisation



Industry Classification of Family Firms in the Prime Standard

Industry Classification of Family Firms vs. Non-Family Firms, sorted by Family Firms (Prime Standard, YE 2008)⁽¹⁾

Sector (number of firms)



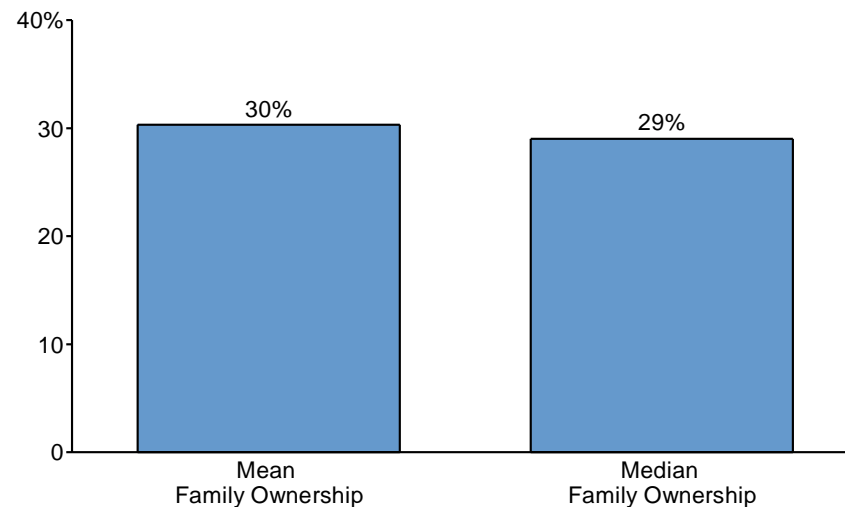
YE =Year End

⁽¹⁾ Basis: Prime Standard 31/12/2008 and Hoppenstedt Aktienführer; Deutsche Börse Industry Classifications.

Strong Family Influence through Family Ownership and Family Management

Family Ownership (Prime Standard, 2008)

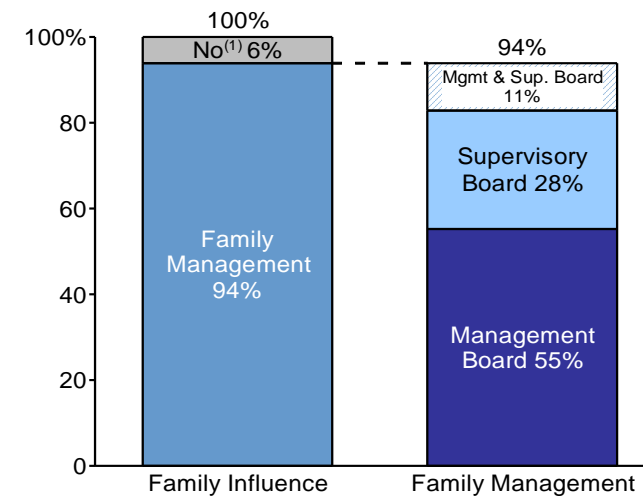
Family Ownership (Total Sample, YE 2008)



Family Firms (FF)

Family Management (Prime Standard, 2008)

Family Management (Total Sample, YE 2008)



⁽¹⁾ In 94% of all 2008 sample companies, the family takes influence through family management and family ownership. Only 6% are solely influenced through family ownership ($\geq 25\%$).

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Introduction of Two New Family Indices: DAXplus Family and DAXplus Family 20

New Indices

**DAXplus Family
(all share index)**

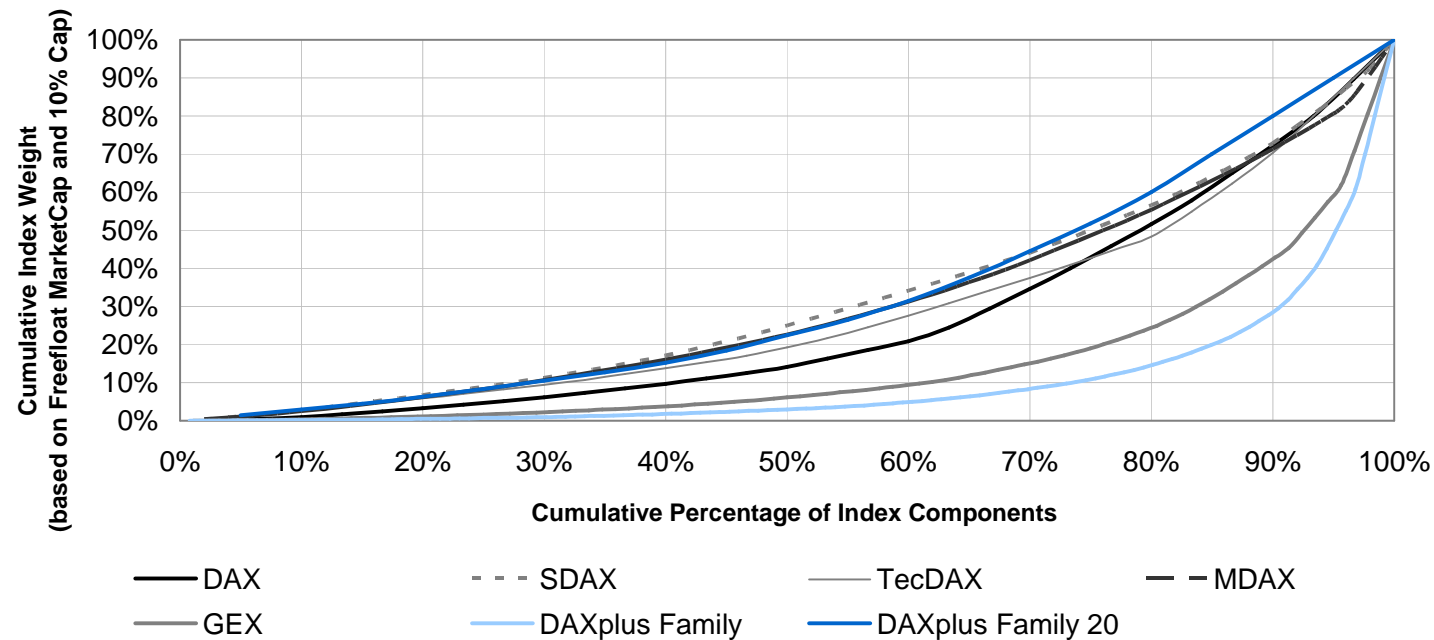
**DAXplus Family 20
(selection index)**

Features

- Selection of companies that fulfil highest transparency standards (Deutsche Börse Prime Standard)
- An index that represents all family firms within the Prime Standard and an index that ensures a liquid style investment opportunity
- Index calculation follows Deutsche Börse's overall index policy (i.e. freefloat weighting, 10% cap)
- Selection of family firms based on a clear set of criteria and extensive (university) research

Extent of Concentration – A Comparison of German Indices

Concentration DAX, SDAX, TecDAX, MDAX, GEX, DAXplus Family⁽¹⁾, YE 2008



- The cumulative distribution functions show a relatively high concentration on only a few large stocks in GEX and DAXplus Family in comparison to other German indices

⁽¹⁾ Freefloat-based market capitalisation following the calculation method of Deutsche Börse.

Top 10 Index Companies as of YE 2008

DAXplus Family⁽¹⁾

Reporting Instrument	Sector	Index Weight	Adj. Market Cap. (mm)
1 VOLKSWAGEN AG ST O.N.	Automobile	10,0%	2.581
2 SAP AG O.N.	Software	10,0%	2.581
3 METRO AG ST O.N.	Retail	10,0%	2.581
4 HENKEL AG+CO.KGAA ST O.N.	Consumer	9,2%	2.363
5 RHOEN-KLINIKUM O.N.	Pharma & Health	5,8%	1.485
6 WACKER CHEMIE O.N.	Chemicals	5,1%	1.305
7 SOLARWORLD AG O.N.	Industrial	4,9%	1.265
8 SYMRISE AG INH. O.N.	Chemicals	4,3%	1.109
9 FRESENIUS SE O.N. ST	Pharma & Health	3,4%	882
10 VOSSLOH AG O.N.	Industrial	2,9%	748
DAXplus Family (Total Market Cap.)			25.805

DAXplus Family 20⁽¹⁾

Reporting Instrument	Sector	Index Weight	Adj. Market Cap. (mm)
1 VOLKSWAGEN AG ST O.N.	Automobile	10,0%	1.805
2 SAP AG O.N.	Software	10,0%	1.805
3 METRO AG ST O.N.	Retail	10,0%	1.805
4 HENKEL AG+CO.KGAA ST O.N.	Consumer	10,0%	1.805
5 RHOEN-KLINIKUM O.N.	Pharma & Health	8,2%	1.485
6 WACKER CHEMIE O.N.	Chemicals	7,2%	1.305
7 SOLARWORLD AG O.N.	Industrial	7,0%	1.265
8 SYMRISE AG INH. O.N.	Chemicals	6,1%	1.109
9 FRESENIUS SE O.N. ST	Pharma & Health	4,9%	882
10 VOSSLOH AG O.N.	Industrial	4,1%	748
DAXplus Family 20 (Total Market Cap.)			18.054

DAX

Reporting Instrument	Sector	Index Weight	Adj. Market Cap. (mm)
1 E.ON AG NA	Utilities	10,4%	45.921
2 SIEMENS AG NA	Industrial	9,7%	43.022
3 ALLIANZ SE VNA O.N.	Insurance	7,7%	33.979
4 DT.TELEKOM AG NA	Telecom.	7,2%	32.022
5 BAYER AG O.N.	Chemicals	7,2%	31.758
6 VOLKSWAGEN AG ST O.N.	Automobile	6,2%	27.516
7 RWE AG ST O.N.	Utilities	5,9%	25.943
8 BASF SE O.N.	Chemicals	5,8%	25.487
9 DAIMLER AG NA O.N.	Automobile	5,4%	23.799
10 MUENCH.RUECKVERS. O.N.	Insurance	5,2%	22.911
DAX (Total Market Cap.)			442.525

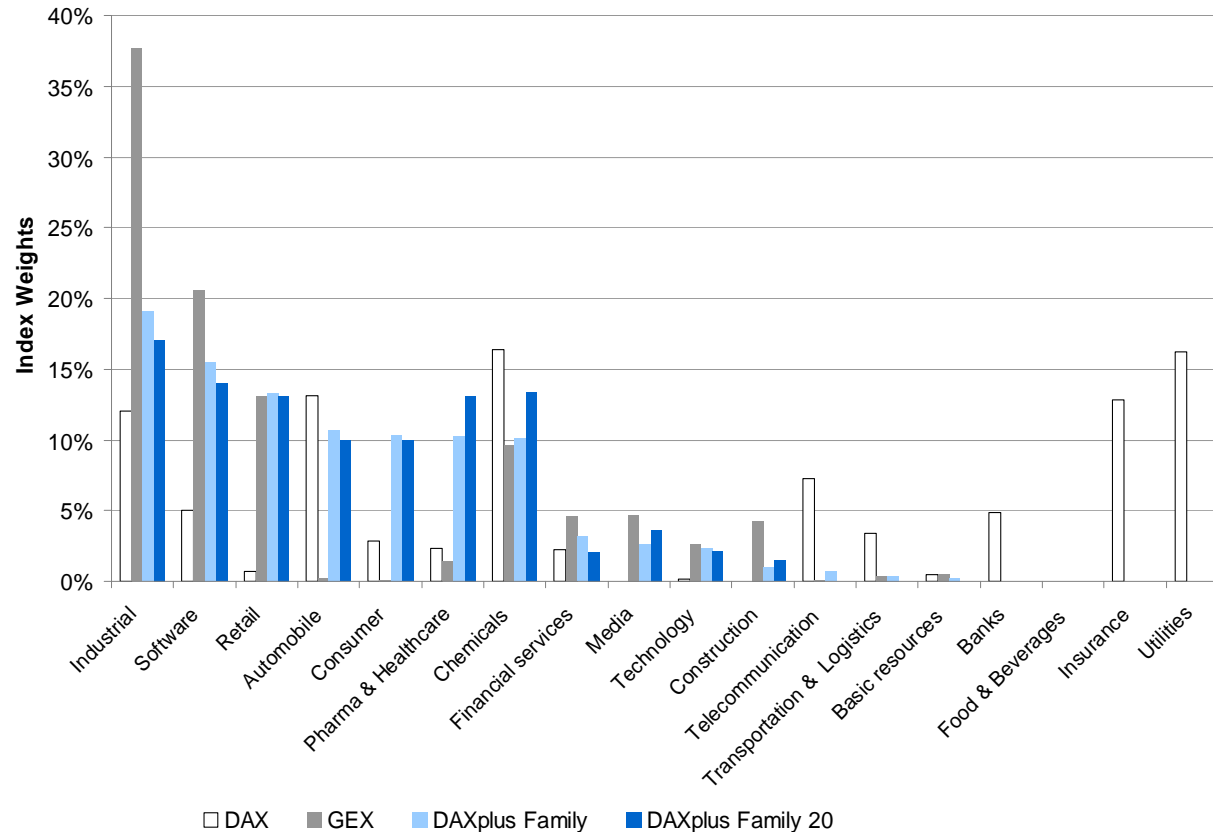
GEX

Reporting Instrument	Sector	Index Weight	Adj. Market Cap. (mm)
1 SOLARWORLD AG O.N.	Industrial	9,9%	620
2 SOFTWARE AG O.N.	Software	9,7%	608
3 WACKER CHEMIE O.N.	Chemicals	9,7%	607
4 FIELMANN AG O.N.	Retail	9,0%	566
5 RATIONAL AG	Industrial	4,3%	273
6 BAUER AG	Construction	4,2%	261
7 CTS EVENTIM AG	Media	4,1%	258
8 KWS SAAT AG O.N.	Industrial	3,9%	243
9 TAKKT AG O.N.	Retail	2,5%	159
10 GRENKELEASING AG O.N.	Financial services	2,3%	145
GEX (Total Market Cap.)			6.285

⁽¹⁾ Assuming scheduled churning on year end for DAXplus Family and DAXplus Family 20. Adjusted number of shares according to the 10% cap limit on 30/12/2008.

Comparison of Industry Weightings

Industry Weightings in DAX, GEX and DAXplus Family, YE 2008



- DAXplus Family and DAXplus Family 20 have a broader diversification than the GEX index with Industrials, Software and Retail being the largest industries

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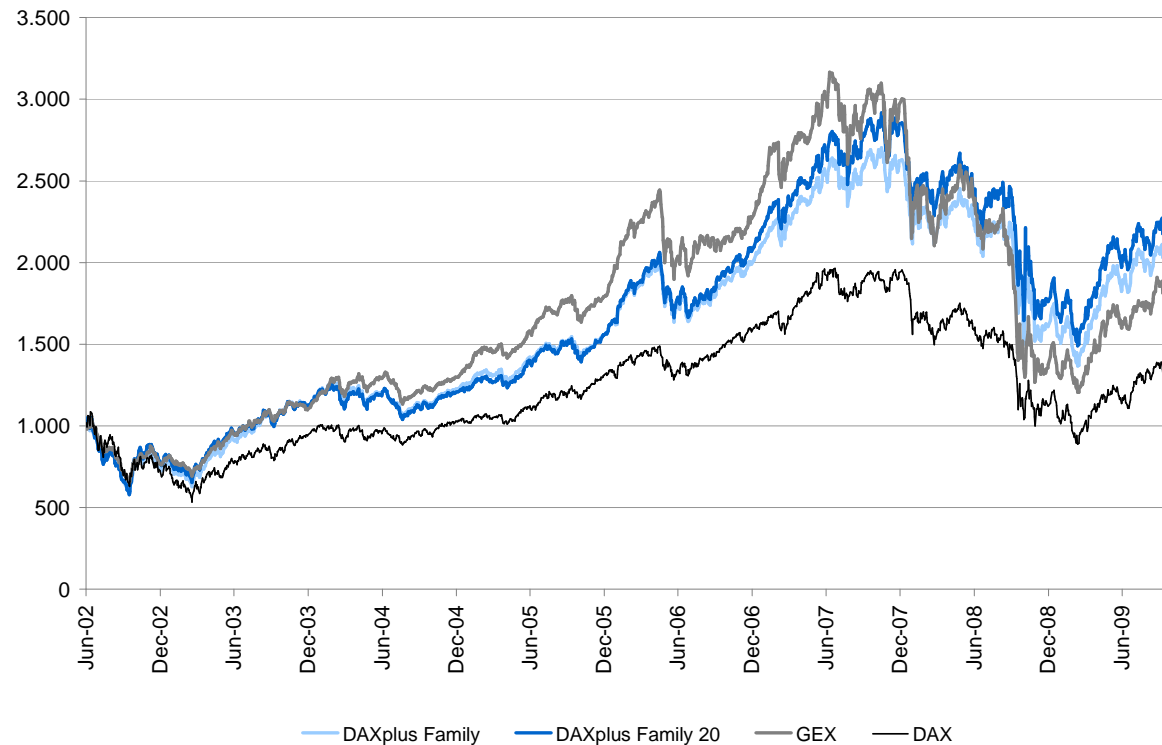
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3. Summary and Outlook

Index Performance

Index Performance of DAX, GEX and DAXplus Family, 2002 - 2009



- Return p.a. for the period from 24/06/2002⁽¹⁾ to 05/11/2009:

DAXplus Family	10.65%
DAXplus Family 20	11.72%
GEX	5.57%
DAX	3.92%

⁽¹⁾ Beginning of index weighting on a freefloat basis.

Return and Risk

Return and Risk of DAX, SDAX, TecDAX, MDAX, GEX, CDAX and DAXplus Family⁽¹⁾

Return and Risk, 24/06/2002 - 04/11/2009

	DAX	SDAX	TecDAX	MDAX	GEX	CDAX	DAXplus Family	DAXplus Family 20
(1) Average daily return	0,03%	0,02%	0,03%	0,04%	0,04%	0,03%	0,05%	0,05%
(2) Median	0,10%	0,11%	0,10%	0,16%	0,14%	0,10%	0,12%	0,14%
(3) Return p.a.	3,59%	4,72%	2,23%	7,83%	8,11%	3,88%	10,52%	11,62%
(4) Max. daily loss	-7,16%	-7,18%	-11,27%	-8,66%	-11,34%	-7,27%	-11,88%	-11,68%
(5) Date of max. loss ⁽²⁾	21.01.08	06.10.08	06.10.08	06.10.08	06.10.08	06.10.08	29.10.08	29.10.08
(6) Standard deviation	1,70%	1,11%	1,88%	1,46%	1,50%	1,60%	1,47%	1,54%
(7) Variance (ann.)	7,27%	3,10%	8,81%	5,36%	5,64%	6,39%	5,43%	5,97%
(8) Volatility (ann.)	26,96%	17,61%	29,68%	23,14%	23,74%	25,28%	23,29%	24,42%
(9) Coefficient of variation =(6)/(1)	60,1096	45,7233	71,4240	36,2693	35,7771	57,6966	30,0764	28,6913
(10) Kurtosis	5,3908	8,3793	4,4759	6,1697	10,6144	5,0908	26,3537	21,8184
(11) Skewness	0,2946	-0,3865	-0,0027	-0,0660	-0,1995	0,2012	1,4036	1,2526

- DAXplus Family and DAXplus Family 20 achieved the highest **annual returns** and the **lowest coefficient of variation** in the period from June 2002 to November 2009

⁽¹⁾ Calculations are based in discrete daily returns, variance and volatility are annualised on the basis of 250 trading days per year.

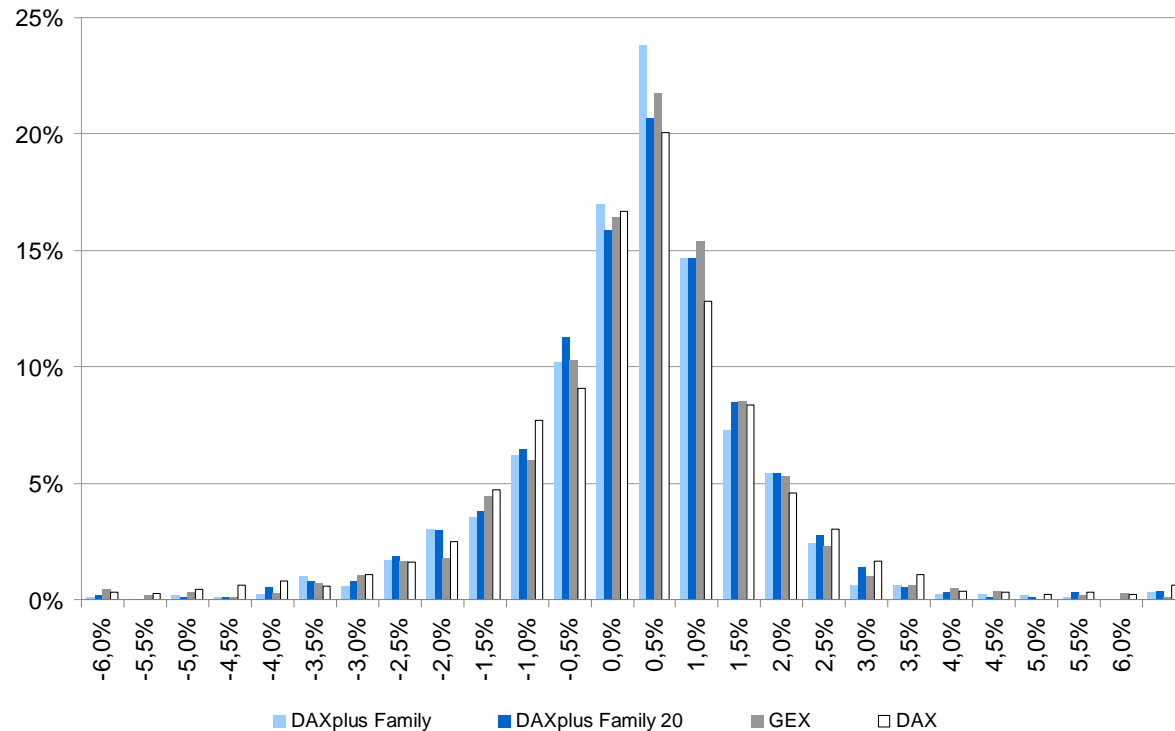
⁽²⁾ 21/01/2008 DAX loses more than 7% as investors fear the recession and a deterioration in the banking system.

06/10/2008 Second rescue package for HRE – equity indices fall sharply.

29/10/2008 Massive price reduction in VW shares after controlling shareholder Porsche took steps to ease a squeeze on shortsellers.

Distribution of Daily Returns

Daily Returns of DAX, GEX and DAXplus Family⁽¹⁾, 2002 - 2009



- The distribution of daily DAXplus Family and DAXplus Family 20 returns is right-skewed
- Daily returns of the DAXplus Family, DAXplus Family 20 as well as the GEX index have a distribution with positive excess kurtosis, i.e. a leptokurtic distribution

⁽¹⁾ Calculations are based in discrete daily returns, variance and volatility are annualised on the basis of 250 trading days per year.

Correlation of Daily Returns (1/2)

Correlation between DAX, SDAX, TecDAX, MDAX, GEX, CDAX and DAXplus Family⁽¹⁾

24/06/2002 - 04/11/2009

	DAX	SDAX	TecDAX	MDAX	GEX	CDAX	DAXplus Family	DAXplus Family 20
DAX	1,000							
SDAX	0,612	1,000						
TecDAX	0,786	0,735	1,000					
MDAX	0,775	0,833	0,818	1,000				
GEX	0,712	0,843	0,877	0,868	1,000			
CDAX	0,997	0,659	0,816	0,818	0,754	1,000		
DAXplus Family	0,836	0,634	0,783	0,731	0,759	0,847	1,000	
DAXplus Family 20	0,821	0,612	0,779	0,728	0,764	0,833	0,991	1,000

- Both family indices have the highest correlation with CDAX and DAX over the period from June 2002 to November 2009

⁽¹⁾ Calculations are based in discrete daily returns, variance and volatility are annualised on the basis of 250 trading days per year.

Correlation of Daily Returns (2/2)

Correlation between DAX, SDAX, TecDAX, MDAX, GEX, CDAX and DAXplus Family⁽¹⁾

01/01 - 31/12 (2009: 01/01 -04/11)

Correlation DAX plus Family with	2005	2006	2007	2008	2009
DAX	0,811	0,867	0,856	0,805	0,903
SDAX	0,741	0,840	0,848	0,559	0,825
TecDAX	0,825	0,887	0,911	0,631	0,882
MDAX	0,856	0,924	0,883	0,585	0,907
GEX	0,893	0,903	0,928	0,634	0,889
CDAX	0,845	0,906	0,893	0,795	0,916
DAXplus Family 20	0,976	0,851	0,993	0,998	0,886

01/01 - 31/12 (2009: 01/01 -04/11)

Correlation DAX plus Family 20 with	2005	2006	2007	2008	2009
DAX	0,766	0,851	0,833	0,812	0,886
SDAX	0,683	0,805	0,808	0,559	0,792
TecDAX	0,806	0,895	0,909	0,644	0,877
MDAX	0,836	0,908	0,855	0,598	0,894
GEX	0,897	0,912	0,927	0,643	0,879
CDAX	0,802	0,889	0,868	0,803	0,899
DAXplus Family	0,976	0,851	0,993	0,998	0,886

- The correlation between DAXplus Family/DAXplus Family 20 and other indices is relatively high, although we observe a lower correlation in 2008 which is related to the high volatility in the VW share price

⁽¹⁾ Calculations are based in discrete daily returns, variance and volatility are annualised on the basis of 250 trading days per year.

Liquidity of DAXplus Family 20

Liquidity 2006 – 2009

2009 (Jan - Nov)

	Daily Volume (€ mm)	Relative Spread (bps)	Price Impact (%)
Average	19,74 Mio. €	0,8 bps	0,05%
Maximum	157,25 Mio. €	1,9 bps	0,32%
Minimum	0,61 Mio. €	0,2 bps	0,00%

2008

	Daily Volume (€ mm)	Relative Spread (bps)	Price Impact (%)
Average	75,91 Mio. €	0,7 bps	0,04%
Maximum	530,68 Mio. €	1,6 bps	0,48%
Minimum	0,59 Mio. €	0,1 bps	0,00%

2007

	Daily Volume (€ mm)	Relative Spread (bps)	Price Impact (%)
Average	92,14 Mio. €	0,5 bps	0,04%
Maximum	696,57 Mio. €	1,5 bps	0,53%
Minimum	0,89 Mio. €	0,1 bps	0,00%

2006

	Daily Volume (€ mm)	Relative Spread (bps)	Price Impact (%)
Average	52,57 Mio. €	0,5 bps	0,03%
Maximum	382,28 Mio. €	1,0 bps	0,27%
Minimum	1,32 Mio. €	0,1 bps	0,00%

- The 20 index members in DAXplus Family 20⁽¹⁾ in 2009 are also part of the following indices: 3 in DAX, 7 in MDAX, 4 in TecDAX und 4 in SDAX
- The relative spread as well as the price impact proxy indicate an increased illiquidity of single stocks in recent years

⁽¹⁾ Basis for all calculations is the composition of DAXplus Family 20 in each year.

Volume traded at all German stock exchanges at which a stock is listed. Source: Datastream.

Price Impact = Difference of (end of day) price and end of day price at the previous day/daily traded average volume.

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3. Summary and Outlook

1. We analyse the features and characteristics of a „Family Firm Index“ (DAXplus Family and DAXplus Family 20).
2. We define Family Firms as firms where the founding family holds (a) at least 25% of the voting rights or (b) holds at least 5% and is represented in the supervisory or management board of the company.
3. Approximately 30% of the companies listed in the Prime Standard are Family Firms according to our definition. They amount to approximately 20% of total market capitalisation.
4. DAXplus Family outperformed the DAX in the period from June 2002 to November 2009 with 10.6% p.a. (DAXplus Family) compared to 3.9% p.a. (DAX).
5. DAXplus Family is dominated by some heavyweights (e.g. VW, SAP, Metro, Henkel). As a result, we see a relatively high correlation with the DAX index (around 85%).

6. DAXplus Family shows an average annual volatility of 23.3% over the observed period of time. The DAX volatility reached 26.9%.
7. DAXplus Family informs about the performance of family firms and can be used as a benchmark index for this important segment.
8. Due to the relatively high concentration, a selection index (e.g. DAXplus Family 20, an index that consists, in terms of freefloat market capitalisation, of the 20 biggest family firms) could likewise carry out that information and benchmark function.
9. Due to its high level of liquidity, DAXplus Family 20 meets the requirements of an investment and trading product.
10. The average relative spread of DAXplus Family 20 shares in the observed period was 0.5-0.8 bps.

- Further cooperation – after the creation of the GEX – between Deutsche Börse and CEFS in terms of index member selection and index calculation
 - Introduction of DAXplus Family and DAXplus Family 20 indices as of 4 January 2010
 - Quarterly updated index composition
 - Introduction of performance and price indices

Additional Information (Back-Up)

Components of DAXplus Family 20

Rolling 12-Months Correlation of Returns

Components of DAXplus Family 20

30/12/2008⁽¹⁾

	ISIN	Name	Index Weight
1	DE0007664005	VOLKSWAGEN AG ST O.N.	10,00%
2	DE0007164600	SAP AG O.N.	10,00%
3	DE0007257503	METRO AG ST O.N.	10,00%
4	DE0006048408	HENKEL KGAA ST O.N.	10,00%
5	DE0007042301	RHOEN-KLINIKUM O.N.	8,23%
6	DE000WCH8881	WACKER CHEMIE O.N.	7,23%
7	DE0005108401	SOLARWORLD AG O.N.	7,01%
8	DE000SYM9999	SYMRISE AG INH. O.N.	6,14%
9	DE0005785604	FRESENIUS SE O.N. ST	4,89%
10	DE0007667107	VOSSLOH AG O.N.	4,14%
11	DE0005089031	UTD.INTERNET AG NA	4,01%
12	DE0005772206	FIELMANN AG O.N.	3,14%
13	DE0006335003	KRONES AG O.N.	2,56%
14	DE000A0WMPJ6	AIXTRON AG NA O.N.	2,19%
15	DE0005501357	A.SPRINGER AG VNA	2,18%
16	DE0006569908	MLP AG	2,05%
17	DE000A0DJ6J9	SMA SOLAR TECHNOL.AG	1,85%
18	DE0007010803	RATIONAL AG	1,51%
19	DE0005168108	BAUER AG	1,45%
20	DE0005470306	CTS EVENTIM AG	1,43%

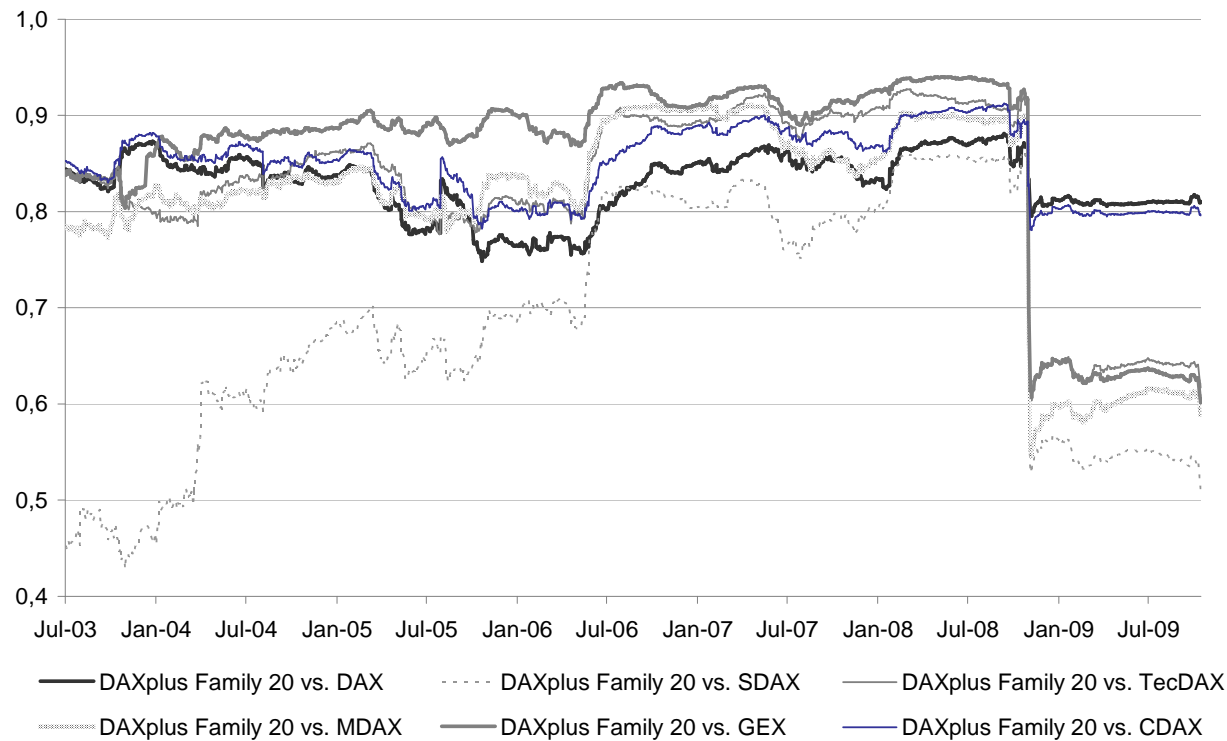
30/10/2009

	ISIN	Name	Index Weight
1	DE0006048408	HENKEL KGAA ST O.N.	11,54%
2	DE0007257503	METRO AG ST O.N.	10,67%
3	DE0007664005	VOLKSWAGEN AG ST O.N.	9,95%
4	DE0007164600	SAP AG ST O.N.	9,19%
5	DE0007042301	RHOEN-KLINIKUM O.N.	8,57%
6	DE000A0WMPJ6	AIXTRON AG NA O.N.	7,37%
7	DE000WCH8881	WACKER CHEMIE O.N.	6,30%
8	DE000SYM9999	SYMRISE AG INH. O.N.	5,96%
9	DE0005108401	SOLARWORLD AG O.N.	5,29%
10	DE0005089031	UTD.INTERNET AG NA	4,39%
11	DE0005785604	FRESENIUS AG O.N. ST	3,76%
12	DE0005772206	FIELMANN AG O.N.	2,62%
13	DE0007667107	VOSSLOH AG O.N.	2,53%
14	DE000A0DJ6J9	SMA SOLAR TECHNOL.AG	2,50%
15	DE0005501357	A.SPRINGER AG VNA	2,34%
16	DE0006335003	KRONES AG O.N.	1,94%
17	DE0005470306	CTS EVENTIM AG	1,58%
18	DE0007010803	RATIONAL AG	1,32%
19	DE0006569908	MLP AG	1,15%
20	DE0005168108	BAUER AG	1,03%

⁽¹⁾ Numbers highlighted in blue: adjusted number of shares according to 10% cap limit on 30/12/2008.

Correlation of Daily Returns

Rolling 12-Months Correlation of Daily Returns, Starting 26/06/2002



- We see a relatively stable correlation between DAXplus Family 20 and most of the other German indices
- However, due to high volatility in VW shares (index member of DAX, CDAX and DAXplus Family 20) on 27-29 October, the correlation falls on the respective days