



MUNICH RE GROUP

EUROPEAN EMBEDDED VALUE 2008

**SUPPLEMENTARY INFORMATION REGARDING LIFE AND HEALTH
EMBEDDED VALUE RESULTS 2008**

3 March 2009



Contents

1	Introduction	3
1.1	Scope of disclosure.....	3
1.2	Covered business	3
1.3	Definition of embedded value.....	4
1.4	Disclaimer	5
2	Embedded value results 2008.....	6
2.1	Reinsurance.....	6
2.2	Primary insurance	9
3	Embedded value methodology	17
3.1	General remarks	17
3.2	In-force and new business	17
3.3	Look-through principle	17
3.4	Adjusted net worth	17
3.5	Present value of in-force business	18
3.6	Time value of financial options and guarantees	19
3.7	Cost of holding capital.....	20
3.8	Change in embedded value	21
3.9	Embedded value earnings	21
3.10	Value added by new business	22
3.11	Operating assumptions	22
3.12	Tax assumptions.....	23
3.13	Economic assumptions	23
3.14	Consolidation	23
3.15	Valuation of pension fund liabilities	23
3.16	Foreign currency translation.....	23
4	IFRS reconciliation	24
4.1	Reinsurance.....	24
4.2	Primary insurance	24
5	Sensitivities	25
5.1	Reinsurance.....	25
5.2	Primary insurance	26
6	Summary of assumptions	28
6.1	Shareholders' share.....	28
6.2	Tax rates	28
6.3	Currency exchange rates	28
6.4	Economic assumptions	29
7	Independent Assurance Report.....	31
8	Glossary.....	33



1 Introduction

1.1 Scope of disclosure

In May 2004 the CFO Forum, a group representing the Chief Financial Officers of major European insurers, published the European Embedded Value Principles (EEVP). The Munich Re Group has adopted the EEVP from the reporting year 2005 on.

Since then, the Munich Re Group applies a strictly market-consistent approach to calculate European Embedded Value results. Therefore we comply with central standards of the European Insurance CFO Forum Market Consistent Embedded Value Principles[®], published in June 2008. In particular, we use swap rates as an approximation of risk-free interest rates, we use observed implied volatilities as at each valuation date (for details, see Section 3.13) and we do not include any allowance for liquidity premia.

In this document, the following topics are covered separately for our life reinsurance business on the one hand and our primary life and German primary health business on the other hand:

- The European Embedded Value as at 31 December 2008
- An analysis of value added (embedded value earnings) during 2008
- A detailed description of the embedded value methodology applied
- A reconciliation of embedded value with IFRS equity
- An analysis of the sensitivities of the embedded value as at 31 December 2008 and 2008 value added by new business to changes in certain key assumptions

1.2 Covered business

The embedded value is reported for the following covered business:

- All business written in life reinsurance entities, excluding medical reinsurance business
- Business written in all major primary life and German health entities

German health primary business is long-term business similar to life business and is therefore included in the embedded value. Medical reinsurance business is short term in nature and therefore excluded from the embedded value.

The reinsurance companies writing covered life reinsurance business are listed in the following table:

Australia	Munich Reinsurance Company of Australasia Ltd
Brazil	Münchener Rück do Brasil Resseguradora S.A.
Germany	Münchener Rückversicherungs-Gesellschaft AG
Italy	Münchener Rück Italia S.p.A.
Russia	Munich Reinsurance Company Life Reinsurance Eastern Europe/Central Asia
South Africa	Munich Reinsurance Company of Africa Ltd
Switzerland	New Reinsurance Company
USA	Munich American Reassurance Company

© Copyright © Stichting CFO Forum Foundation 2008



Life reinsurance business written by branch offices of the above companies is also included. Major branch offices writing life reinsurance business are:

Canada	Munich Reinsurance Company Canada Branch (Life)
United Kingdom	Munich Reinsurance Company United Kingdom Life Branch

Covered business represents 100% of life reinsurance business written in the Munich Re Group. The stand-alone embedded value figures are fully reflected in the embedded value figures at Munich Re Group level.

The primary insurance companies writing covered life and health primary insurance business are listed in the following table:

Austria	VICTORIA-VOLKSBANKEN Versicherungsaktiengesellschaft Bank Austria Creditanstalt Versicherung AG
Belgium	Hamburg-Mannheimer N.V./S.A.
Estonia	ERGO Elukindlustuse AS
Germany	DKV Deutsche Krankenversicherung Aktiengesellschaft Hamburg-Mannheimer Versicherungs-Aktiengesellschaft KarstadtQuelle Lebensversicherung AG VICTORIA Lebensversicherung Aktiengesellschaft VICTORIA Krankenversicherung Aktiengesellschaft
Italy	ERGO Previdenza S.p.A.
Latvia	ERGO Latvija dzīvība AAS
Lithuania	ERGO Lietuva gyvybes draudimo UAB
Poland	Sopockie Towarzystwo Ubezpieczeń na Życie ERGO Hestia S.A.
Portugal	VICTORIA-Seguros de Vida S.A.
Spain	ERGO Vida Seguros y Reaseguros, Sociedad Anónima

Covered business includes more than 90% of total primary life and health business written in the Munich Re Group, measured by premium income. The consolidation of the stand-alone embedded value figures into the embedded value figures at Munich Re Group level takes into account the dilution of earnings through minority shareholders and policyholders, where applicable.

1.3 Definition of embedded value

Embedded value is the present value of shareholders' interests in the earnings distributable from assets allocated to covered business after making sufficient allowance for the aggregate risks in the covered business. The European Embedded Value consists of the following components:

- Present value of future shareholder cash flows from in-force business (PVIF)
- Cost of holding capital (CoC)
- Adjusted net worth (ANW), broken down into free surplus (FS) and required capital (RC)

The present value of future shareholder cash flows from in-force business (PVIF) includes the *time value* of financial options and guarantees. The PVIF before deduction of the allowance for the time value of financial options and guarantees reflects the *intrinsic value* of financial options and guarantees of in-force covered business. The time value of financial



options and guarantees is calculated using stochastic techniques and disclosed separately (see also in Section 3.6).

Non-financial risks that are not reflected in the market-consistent calculation of the PVIF are allowed for in the cost of holding capital. A detailed description of the embedded value methodology is given in Section 3.

The embedded value is calculated on a local statutory basis. The results are presented net of minority interests and policyholder participations.

1.4 Disclaimer

This report contains forward-looking statements that are based on current assumptions and forecasts of the management of the Munich Re Group companies mentioned in Section 1.2. Known and unknown risks, uncertainties and other factors could lead to material differences between the forward-looking statements given here and the actual development, in particular the results, financial situation and performance of our company. The Munich Re Group assumes no liability to update these forward-looking statements or to conform them to future events or developments.



2 Embedded value results 2008

Capital markets worldwide experienced huge falls in the prices of equities and structured products as well as a significant fall in swap yields and a dramatic rise in implied interest volatilities especially at the end of 2008. Because of low exposure to equities and structured products, our embedded value results are dominated by the development of bond markets. Widening of credit spreads affected covered business from both reinsurance and primary insurance.

While the embedded value of our life reinsurance and primary health business were only moderately affected by the market consistent valuation in distorted capital markets our primary life business suffered considerably from declining swap yields in combination with a sharp increase of implied swaption volatilities because of the substantial financial options and guarantees immanent to this business.

Given the turbulent market conditions the CFO Forum announced on 19 December 2008 that it would review the Market Consistent Embedded Value Principles[®] in particular concerning the use of implied volatilities, swap rates and liquidity premia.

In contrast to a number of competitors, we consciously decided to continue to value our covered business on a prudent and strictly market-consistent basis. Our valuation is based on swap curves and observed implied volatilities as at 31 December 2008; liquidity premia are not taken into account.

2.1 Reinsurance

The impact of recent financial markets' turmoil on our reinsurance business is comparatively moderate. Especially the new business shows favourable figures ahead of our internal and external targets. Adverse currency movements lead to a reduction of the European Embedded Value.

The most important European Embedded Value components for reinsurance business as at 31 December 2007 and 31 December 2008 are shown in the following table:

All figures in €m	31.12.2008	31.12.2007
European Embedded Value	6,116	6,662
- PVIF	4,486	4,926
- CoC	-971	-948
- ANW	2,601	2,684
CoC	-971	-948
- Tax and investment expense CoC	-200	-259
- Frictional CoC	-771	-689
ANW	2,601	2,684
- Required capital	1,736	1,832
- Free surplus	865	852
Time value of financial options and guarantees (TVFOG)		
- EEV before TVFOG	6,191	6,698
- TVFOG	-75	-36
- European Embedded Value	6,116	6,662



The embedded value shows a decrease of 8.2% over the year 2008. Detailed explanations follow later in this section.

The increase in the value of financial options and guarantees over the year 2008 is due to the substantially changed capital market situation, in particular due to an increase in implied volatilities. In absolute terms, the value of financial options and guarantees is still moderate, at €75m, as only a very limited portion of our life reinsurance business includes financial options and guarantees.

The total required capital for covered business as at 31 December 2008 of €1,736m exceeds the capital required at life reinsurance level to cover all minimum solvency requirements by €769m.

The change in embedded value in 2008 is shown in the following table:

All figures in €m	EV	PVIF	CoC	ANW
Opening embedded value	6,662	4,926	-948	2,684
Embedded value earnings	498	123	-115	490
Currency movements	-808	-563	92	-337
Value of acquired/(divested) business	0	0	0	0
Capital movements	-236			-236
Closing embedded value	6,116	4,486	-971	2,601

The change in embedded value in 2008 was driven by robust embedded value earnings (7.5% of opening embedded value). The currency movements reflect the weakening of the Canadian dollar and the pound (sterling), which is partly offset by the strengthening of the US dollar. The capital movements show a repatriation of €236m from life reinsurance business to the Group.

The breakdown of the 2008 embedded value earnings is shown in the following table:

		EV	PVIF	CoC	ANW
Expected return	€m	326	205	36	85
Expected transfer from PVIF to ANW	€m	0	-327	0	327
Experience variances	€m	42	-171	19	194
Operating assumption changes	€m	-106	-213	24	83
Value added by new business	€m	356	624	-105	-163
Operating embedded value earnings	€m	618	118	-26	526
- as % of opening embedded value	%	9.3			
Tax variances/assumption changes	€m	2	1	0	1
Economic variances	€m	-122	4	-89	-37
Total embedded value earnings	€m	498	123	-115	490
- as % of opening embedded value	%	7.5			

The value added by new business increased significantly compared to 2007. It was supported by a non-recurring positive effect from a change in our retention policy, which contributed about €53m to the value added by new business in 2008. Excluding this one-off effect, the value added by new business would be €303m, still ahead of our target.

The operating experience in 2008 was in aggregate slightly better than expected.



The operating assumption changes reduced the embedded value in aggregate by €106m, mainly driven by assumption changes in our North American business. For some treaties, mortality and lapse assumptions have been strengthened, while favourable mortality experience for other treaties led to positive assumption changes.

The operating embedded value earnings of 9.3% relative to opening embedded value were above our expectations, mainly driven by a strong value added by new business.

In 2008, there were no changes in the tax legislation with a material effect on the embedded value.

The economic variances were slightly negative. The drop in swap yields for all major currencies increased the present value of future profits, as indicated by the sensitivities. However, this was more than cancelled out by widening credit spreads, especially in North America.

The total embedded value earnings of 7.5% were slightly below the embedded value target of 8% to 9%, but overall quite satisfactory, given the difficult capital market environment.

The excellent results for new business are reflected in the following key profitability ratios:

New business		2008	2007
Value added by new business (VANB)	€m	356	277
Present value of new business premiums (PVNBP)	€m	5,721	5,069
Annual premium equivalent (APE)	€m	646	522
Opening embedded value (EV)	€m	6,662	5,962
New business margin (VANB/PVNBP)	%	6.2	5.5
VANB/APE	%	55.1	53.1
VANB/EV	%	5.3	4.6

The present value of new business premiums shows a significant increase of 12.9%. The profitability measured as new business margin rose from 5.5% to 6.2%.

The development of required capital in 2008 is shown in the following table:

All figures in €m

Required capital as at 31 December 2007	1,832
Change in required capital for in-force business	-143
Required capital for 2008 new business	176
Currency movements	-129
Required capital as at 31 December 2008	1,736

The change in required capital in 2008 was driven by two factors. Firstly, due to the increase in business, the required capital for new business is larger than the required capital released by the run-off of existing business. Secondly, changes in foreign exchange rates decreased the required capital in the reporting currency by €129m.

Please note that these numbers may differ from the stand-alone economic capital requirements which were disclosed in the Munich Re Group analysts' conference. The figures differ mainly because the stand-alone economic capital numbers are derived on a fully economic basis, whereas the required capital numbers used in this EEV disclosure make additional allowance for regulatory restrictions.

2.2 Primary insurance

Covered primary insurance business consists of the following three business segments

- German primary life insurance,
- International primary life insurance, and
- German primary health insurance

which are reported in total and individually in the following sections.

2.2.1 Primary insurance in aggregate

The most important European Embedded Value components for primary insurance business as at 31 December 2007 and 31 December 2008 are shown in the following table:

All figures in €m	31.12.2008	31.12.2007
European Embedded Value	3,509	5,406
- PVIF	2,728	4,995
- CoC	-1,220	-1,409
- ANW	2,001	1,820
CoC	-1,220	-1,409
- Tax and investment expense CoC	-336	-172
- CoC for policyholder participation	-285	-645
- Frictional CoC	-599	-592
ANW	2,001	1,820
- Required capital	1,833	1,715
- Free surplus	168	105
Time value of financial options and guarantees (TVFOG)		
- EEV before TVFOG	5,133	5,556
- TVFOG	-1,624	-150
- European Embedded Value	3,509	5,406

Turbulent capital market conditions lead to a significant decrease in present value of in-force business (PVIF) of our German and international primary life business. The major impact came from low risk free interest rates and more than a doubling of interest rate volatilities. This combination led to a sharp increase in the time value of financial options and guarantees that accounts for most of the capital-market-induced losses reported as economic variance. Our swaption programme in Germany and Belgium could mitigate only some of that impact.

The change in embedded value in 2008 is shown in the following table:



All figures in €m	EV	PVIF	CoC	ANW
Opening embedded value	5,406	4,995	-1,409	1,820
Embedded value earnings	-2,237	-2,537	239	61
Currency movements	-6	-4	0	-2
Value of acquired/(divested) business	388	275	-51	164
Capital movements	-42			-42
Closing embedded value	3,509	2,728	-1,220	2,001

The value of acquired business stems from acquisitions in primary life insurance described in Sections 2.2.2 and 2.2.3. The breakdown of embedded value earnings in 2008 is shown in the following table:

		EV	PVIF	CoC	ANW
Expected return	€m	307	230	61	16
Expected transfer from PVIF to ANW	€m	0	-399	0	399
Experience variances	€m	28	63	-15	-20
Operating assumption changes	€m	-113	-271	158	0
Value added by new business	€m	-45	169	-41	-173
Operating embedded value earnings	€m	177	-208	163	222
- as % of opening embedded value	%	3.3			
Tax variances/assumption changes	€m	-174	-171	-10	7
Economic variances	€m	-2,240	-2,158	86	-168
Total embedded value earnings	€m	-2,237	-2,537	239	61
- as % of opening embedded value	%	-41.4			

The operating embedded value earnings of €177m or 3.3% of opening embedded value were strained by overall negative operating assumption changes and a negative value added by new business from our German primary life companies.

Dislocated markets led to extraordinary losses especially in the primary life business, reducing the embedded value by more than 40%. Almost two-thirds of those losses can be attributed solely to the increase of the time value of financial options and guarantees by €1,474m to €1,624m at the expense of the shareholders.

In the following table, key profitability ratios for new business are shown:

New business		2008	2007
Value added by new business (VANB)	€m	-45	164
Present value of new business premiums (PVNBP)	€m	6,526	6,678
Annual premium equivalent (APE)	€m	692	666
Opening embedded value (EV)	€m	5,406	4,154
New business margin (VANB/PVNBP)	%	-0.7	2.5
VANB/APE	%	-6.5	24.6
VANB/EV	%	-0.8	3.9

New business figures and profitability ratios are strongly affected by the negative VANB of our German primary life business.



2.2.2 German primary life insurance business

The most important European Embedded Value components for German primary life insurance business as at 31 December 2007 and 31 December 2008 are shown in the following table:

All figures in €m	31.12.2008	31.12.2007
European Embedded Value	708	2,882
- PVIF	-10	2,456
- CoC	-315	-586
- ANW	1,033	1,012
CoC	-315	-586
- Tax and investment expense CoC	-210	-59
- CoC for policyholder participation	0	-370
- Frictional CoC	-103	-157
ANW	1,033	1,012
- Required capital	1,033	1,012
- Free surplus	0	0
Time value of financial options and guarantees (TVFOG)		
- EEV before TVFOG	2,067	3,020
- TVFOG	-1,359	-138
- European Embedded Value	708	2,882

The financial crisis in 2008 triggered not only a sharp fall in the stock markets but also major upheavals on the interest-rate markets, especially towards the end of the year. At 31 December 2008, the low level of swap yields coupled with extremely high volatilities (see Section 6.4 for details) had a major adverse impact on the economic assessment of long-term liabilities in our German primary life business that is dominated by with-profit funds with substantial interest rate guarantees. Accordingly, the strict market-consistent valuation in dislocated markets obliterated the present value of our German in-force business which is in effect slightly negative as at 31 December 2008.

In line with option price theory, PVIF can be divided into two components, namely intrinsic value and time value. While the intrinsic value (PVIF before TVFOG) is still €1,349m, the time value of options and guarantees (TVFOG) has risen dramatically to -€1,359m. From a shareholders' perspective, this would be the cost of hedging against the impact of future capital-market fluctuations.

However, especially through discretionary scope with regard to profit-sharing and by adapting their long-term investment strategy, companies generally have much more effective instruments to decisively influence the time value of options and guarantees over the course of time, as long as the TVFOG is not locked in, i.e. as long as the time value has not turned into intrinsic value.

The change in embedded value in 2008 is shown in the following table:



All figures in €m	EV	PVIF	CoC	ANW
Opening embedded value	2,882	2,456	-586	1,012
Embedded value earnings	-2,176	-2,491	277	38
Currency movements	0	0	0	0
Value of acquired/(divested) business	32	25	-5	12
Capital movements	-29			-29
Closing embedded value	708	-10	-315	1,033

At the end of 2008 ERGO increased its stake in KarstadtQuelle Lebensversicherung AG from 77.5% to 100%. This transaction increased embedded value by €32m, reported as value of acquired business.

The breakdown of embedded value earnings in 2008 is shown in the following table:

		EV	PVIF	CoC	ANW
Expected return	€m	162	118	43	1
Expected transfer from PVIF to ANW	€m	0	-260	0	260
Experience variances	€m	-15	21	2	-38
Operating assumption changes	€m	-400	-593	194	-1
Value added by new business	€m	-111	34	-15	-130
Operating embedded value earnings	€m	-364	-680	224	92
- as % of opening embedded value	%	-12.6			
Tax variances/assumption changes	€m	-132	-125	-16	9
Economic variances	€m	-1,680	-1,686	69	-63
Total embedded value earnings	€m	-2,176	-2,491	277	38
- as % of opening embedded value	%	-75.5			

Operating assumption changes were dominated by the 9th novation of German Insurance Control Act (Versicherungsaufsichtsgesetz - VAG) in 2008 with a new legislation on policyholder participation (Mindestzuführungsverordnung). While allowing for a stronger participation of the shareholder from asset returns, profit distribution is now separated for different profit sources and loss offset between those is strongly restricted. In combination and considering the smaller assumed future asset returns the overall effect was negative and led to operating assumption losses of €400m, besides other far smaller effects. By implementing this ordinance the ERGO life insurance companies abandoned the policyholder participation on shareholder assets (ANW) which eliminated the cost for policyholder participation (-€370m in 2007). This automatically caused an increase of Tax CoC for holding required capital. Both effects are considered in the CoC column of the embedded value earnings in the table above.

The modelled value added by new business decreased to -€111m: Because of current market conditions profitable business written in the course of the year is reported with a negative value contribution, due to the market-consistent valuation as at the end of the year, that also includes all costs attributed to new business (see also Section 3.10).

Altogether, operating embedded value earnings reduce the opening embedded value by 12.6 %.

Improved modelling of the future tax burden led to tax assumption changes of -€132m.



All effects from capital markets are summarised as economic variances. Since exposure to equity and corporate bonds was limited the high reported losses are dominated by lower future reinvestment returns given the current swap yield curve and by the uncertainty of future investment return as indicated by extremely high implied volatilities. Both are reflected in the strong increase of TVFOG, accounting for 73% of the economic variances of -€1.680m.

As a side-effect of the financial crisis new business volume decreased considerably and fixed acquisition costs strained new business values. However, this effect is dwarfed by the impact of capital market conditions leading to a negative VANB as described above and analogous to the change in PVIF.

New business		2008	2007
Value added by new business (VANB)	€m	-111	105
Present value of new business premiums (PVNBP)	€m	3,525	3,739
Annual premium equivalent (APE)	€m	435	458
Opening embedded value (EV)	€m	2,882	2,211
New business margin (VANB/PVNBP)	%	-3.1	2.8
VANB/APE	%	-25.5	22.9
VANB/EV	%	-3.9	4.7

2.2.3 International primary life insurance business

The most important European Embedded Value components for international primary life insurance business as at 31 December 2007 and 31 December 2008 are shown in the following table:

All figures in €m	31.12.2008	31.12.2007
European Embedded Value	1,018	951
- PVIF	696	762
- CoC	-184	-160
- ANW	506	349
CoC	-184	-160
- Tax and investment expense CoC	-84	-66
- CoC for policyholder participation	0	0
- Frictional CoC	-100	-94
ANW	506	349
- Required capital	338	244
- Free surplus	168	105
Time value of financial options and guarantees (TVFOG)		
- EEV before TVFOG	1,283	963
- TVFOG	-265	-12
- European Embedded Value	1,018	951

As can be seen from the robust PVIF our international primary life insurance operations were not as badly affected as our German business by developments on the capital markets. Nevertheless, the time value of options and guarantees increased considerably.



The following table shows the effects from acquisitions on all embedded value components. In 2008 ERGO increased its stake in ERGO Previdenza S.p.A. from 70.4% to 93.1%. For Bank Austria Creditanstalt Versicherung AG (BACAV) the minority share of 29.5% was increased to a share of 90.0%. Since BACAV was not part of last year's embedded value disclosure the value of acquired business comprises the value of the total 90% stake.

All figures in €m	EV	PVIF	CoC	ANW
Opening embedded value	951	762	-160	349
Embedded value earnings	-285	-312	22	5
Currency movements	-6	-4	0	-2
Value of acquired/(divested) business	356	250	-46	152
Capital movements	2			2
Closing embedded value	1,018	696	-184	506

The breakdown of embedded value earnings in 2008 is shown in the following table:

		EV	PVIF	CoC	ANW
Expected return	€m	64	42	9	13
Expected transfer from PVIF to ANW	€m	0	-86	0	86
Experience variances	€m	-4	-13	2	7
Operating assumption changes	€m	-30	-12	-13	-5
Value added by new business	€m	26	80	-11	-43
Operating embedded value earnings	€m	56	11	-13	58
- as % of opening embedded value	%	5.9			
Tax variances/assumption changes	€m	-7	-4	-1	-2
Economic variances	€m	-334	-319	36	-51
Total embedded value earnings	€m	-285	-312	22	5
- as % of opening embedded value	%	-30.0			

Experience variances and operating assumption changes were negatively affected by higher lapse rates. The main part of negative operating assumption changes was caused by refined operating assumptions for Belgium.

As for German primary life business the biggest part of the negative economic variances was caused by the sharp increase in the time value of options and guarantees.

New business premiums increased due to aforementioned acquisitions but also from organic growth, especially in Poland and to a lesser extent in Belgium. Overall new business profitability suffered from the same effects as the PVIF, as can be seen in the following table:

New business		2008	2007
Value added by new business (VANB)	€m	26	29
Present value of new business premiums (PVNBP)	€m	597	462
Annual premium equivalent (APE)	€m	120	57
Opening embedded value (EV)	€m	951	599
New business margin (VANB/PVNBP)	%	4.4	6.3
VANB/APE	%	21.7	50.9
VANB/EV	%	2.7	4.8

2.2.4 German primary health insurance business

The most important European Embedded Value components for German primary health insurance business as at 31 December 2007 and 31 December 2008 are shown in the following table:

All figures in €m	31.12.2008	31.12.2007
European Embedded Value	1,783	1,573
- PVIF	2,042	1,777
- CoC	-721	-663
- ANW	462	459
CoC	-721	-663
- Tax and investment expense CoC	-42	-47
- CoC for policyholder participation	-283	-275
- Frictional CoC	-396	-341
ANW	462	459
- Required capital	462	459
- Free surplus	0	0
Time value of financial options and guarantees (TVFOG)		
- EEV before TVFOG	1,783	1,573
- TVFOG	0	0
- European Embedded Value	1,783	1,573

The development on the capital markets has had a much smaller impact on our German primary health business than on our German primary life business. A low exposure in equity and corporate bonds kept direct impacts to a minimum. Because the negative impact of reduced future asset returns can be balanced by changing the technical interest rate, lower interest rates have a relatively small effect on the PVIF. As in the previous year, the time value of financial options and guarantees was set to zero to reflect the economics of German primary health business (see also Section 3.6).

The change in embedded value in 2008 is shown in the following table:

All figures in €m	EV	PVIF	CoC	ANW
Opening embedded value	1,573	1,777	-663	459
Embedded value earnings	224	266	-60	18
Currency movements	0	0	0	0
Value of acquired/(divested) business	0	0	0	0
Capital movements	-15			-15
Closing embedded value	1,783	2,042	-721	462

The breakdown of the embedded value earnings in 2008 is shown in the following table:

		EV	PVIF	CoC	ANW
Expected return	€m	81	70	9	2
Expected transfer from PVIF to ANW	€m	0	-53	0	53
Experience variances	€m	47	55	-19	11
Operating assumption changes	€m	317	334	-23	6
Value added by new business	€m	40	55	-15	0
Operating embedded value earnings	€m	485	461	-48	72
- as % of opening embedded value	%	30.8			
Tax variances/assumption changes	€m	-35	-42	7	0
Economic variances	€m	-226	-153	-19	-54
Total embedded value earnings	€m	224	266	-60	18
- as % of opening embedded value	%	14.2			

Lower than expected claims are the main reason for €47m experience variances. Lengthening the projection period from 40 to 80 years in our embedded value models for German health business yields positive operating assumption changes and improves new business profitability, as reported in the following table:

New business		2008	2007
Value added by new business (VANB)	€m	40	30
Present value of new business premiums (PVNBP)	€m	2,404	2,477
Annual premium equivalent (APE)	€m	137	151
Opening embedded value (EV)	€m	1,573	1,344
New business margin (VANB/PVNBP)	%	1.7	1.2
VANB/APE	%	29.2	19.9
VANB/EV	%	2.5	2.2

The German health reform ("Gesundheitsreform") allows existing customers to cancel their health policy in the first half of 2009, with a partial transfer of ageing provisions to another provider. Although the health reform regulations have no noticeable influence on the in-force business we kept the frictional cost parameter unchanged (see also Section 3.7).



3 Embedded value methodology

3.1 General remarks

The embedded value methodology adopted is in accordance with the European Embedded Value Principles as published by the CFO Forum in May 2004. We applied the market-consistent methodology as described in Sections 3.5, 3.6 and 3.13, which leads in particular to a market-consistent assessment of the time value of financial options and guarantees.

3.2 In-force and new business

Reinsurance new business comprises:

- New individual cessions on either new or existing treaties
- New group schemes on either new or existing treaties
- Net increments to existing group schemes
- New and renewed annually renewable treaties

For primary insurance, new business is defined as business arising from the sale of new contracts during the reporting period. The value of new business includes the value of expected renewals on those new contracts and expected future contractual alterations to those new contracts. For German primary life business, new business includes the current year's increments on existing policies.

The definition of in-force business is consistent with the definition of new business.

3.3 Look-through principle

The assets related to covered business are mainly managed by the Munich Re Group's asset management units. The costs and profits from managing these assets are included in the embedded value on a look-through basis.

Costs of other service companies, such as administration and IT, are included in the embedded value on a look-through basis.

Costs of holding companies related to covered business have been allowed for in the embedded value calculations.

3.4 Adjusted net worth

The adjusted net worth (ANW) is defined as follows:

- For pure life reinsurance entities: the local regulatory net worth adjusted to reflect the market value of assets
- For composite reinsurance entities: the allocated required capital
- For primary insurance entities: the local regulatory net worth

In accordance with the European Embedded Value look-through principle, differences between IFRS and statutory pension liabilities are included in the EEV as an adjustment to net assets.



3.4.1 Required capital

The required capital (RC) is defined as follows:

- For reinsurance entities, RC is derived from internal risk models and additional regulatory restrictions.
- For German primary insurers, RC is set to statutory net worth adjusted for differences between IFRS and statutory pension liabilities. With their statutory net worth all German primary insurers covered in this report have statutory solvency ratios well above 150 %.
- For international primary insurers, RC is equal to 100% of the EU minimum solvency requirements. This simplified assumption has little impact on the Munich Re Group's EEV.

3.4.2 Free surplus

The free surplus (FS) is defined as the difference between the adjusted net worth and the required capital. Contrary to previous years, for our German primary insurers differences between IFRS and statutory pension liabilities are not reported as negative free surplus but allowed for in the required capital.

3.5 Present value of in-force business

A bottom-up approach to allow for risk is adopted for the calculation of the present value of in-force business (PVIF). The economic assumptions and discount rates used are calibrated applying a market-consistent methodology to allow for financial risk. In principle, each cash flow is valued according to its inherent financial risk.

For business without significant financial options and guarantees, the certainty-equivalent technique is used. Under this valuation approach, the individual cash flows are adjusted to remove the effects of financial risks. The resulting stream of risk-adjusted profits is then discounted at the risk-free rate.

For business with significant financial options and guarantees, a stochastic model using market-consistent scenarios is applied to determine the present value of in-force business, and the time value of financial options and guarantees. The stochastic models allow for interaction of assets and liabilities and include expected management behaviour, e.g. regarding the investment strategy, the management of unrealised capital gains, and the determination of bonus rates for participating business. In addition, dynamic policyholder behaviour with respect to lapses and surrenders has been allowed for.

In some territories where reinsurance business is written, only limited policy data is available. In such cases, projections are made on a portfolio basis to reflect expected profitability ratios and all other relevant information.

For German primary life business, it is assumed that in case of severe financial distress approval from the regulator is granted to cover policyholder guarantees by the free RfB and the Terminal Bonus Fund (Section 56a of the German Insurance Control Act).

For German primary health business, the development of healthcare costs is based on general inflation assumptions adjusted for higher health inflation in some parts of the business. Premium rates are assumed to increase in line with these developments.

The shareholder share of unrealised capital gains at the end of the projection period is included in the present value of future profits.

3.6 Time value of financial options and guarantees

Participating life business, predominantly German, Belgian and Italian primary business, is generally characterised by the following key features:

- A minimum interest rate or a minimum level of bonus is guaranteed to the policyholder. Hence, whenever the investment return on the allocated assets does not exceed the necessary minimum and other means of funding the guarantees are depleted, the shareholder will bear the cost of maintaining the guarantees.
- Generally, bonuses and crediting rates exceed minimum guaranteed levels. In this case, the amount credited will be based on profit-sharing rules which involve a degree of management discretion.

The participating features are usually a combination of contractual or legal constraints, and management discretion based on competitive pressure or market practice. The participating business has been modelled to reflect both contractual and regulatory constraints as well as internal management rules. Projected surrender rates depend dynamically on the difference between the risk-free interest rate and the credited rate.

In the market-consistent calculation of our European Embedded Value, we allow for the potential impact on future shareholder cash flows of all financial options and guarantees within the in-force covered business. This is reflected in the PVIF. The allowance for the time value of financial options and guarantees is based on stochastic techniques using methods and assumptions consistent with the underlying embedded value. All projected cash flows are valued using economic assumptions in line with the price of similar cash flows that are traded in the capital markets.

Stochastic models are used for all primary life and health insurance business. The time value of financial options and guarantees is determined as the difference between the average present value over all stochastic scenarios and the present value for the certainty equivalent scenario. The stochastic model is run using 1,000 scenarios based on the econometric model described in Section 3.13 and takes the following explicitly into account:

- Management discretion concerning bonus policy and profit-sharing rules
- Timing of realisation of unrealised capital gains
- Dynamic asset allocation, in particular management of the equity-backing ratio
- Dynamic adjustment of technical interest rates for German primary health business
- Surrender rates dependent on the capital markets

The PVIF before allowance for the time value of financial options and guarantees reflects the intrinsic value of financial options and guarantees on in-force covered business. The time value of financial options and guarantees (TVFOG) is disclosed separately.

It is predominantly primary life business that is exposed to financial options and guarantees. The following aspects of financial options and guarantees are of particular relevance:

- All policyholder options, such as full or partial surrender, premium discontinuance, and annuitisation, combined with policyholder guarantees, such as interest-rate guarantees, guaranteed surrender values, or guaranteed annuity rates have a large influence on the PVIF.
- On the other hand companies are able to substantially influence the value of financial options and guarantees, for example by changing their bonus policy for participating life business or by adjusting the long term asset allocation. Such management discretion is subject to any contractual guarantees and regulatory or legal constraints.

The time values of financial options and guarantees published in this and other documents of the Munich Re Group report the net effect.



Our life reinsurance portfolio has only a very limited exposure to financial options and guarantees.

3.6.1 TVFOG in German primary life business

In German primary life business by far the biggest share of financial options and guarantees results from the guaranteed interest rate together with legal restrictions for the minimum policyholder participation.

The maximum actuarial interest rate in life insurance (commonly referred to as the “guaranteed interest rate”) is laid down in the German federal ordinance concerning actuarial assumptions for future policy benefits (“Deckungsrückstellungsverordnung”).

The new German federal ordinance relating to minimum policyholder participation in life insurance (“Mindestzuführungsverordnung”) effective from 4 April 2008 applies stricter rules concerning customers’ minimum participation in statutory profits. In comparison with previous regulations, loss offset from the different profit sources (investment result, mortality result, remaining result) is strongly restricted. On the other hand, for business written before 1994 participation in investment result is now less restricted. Overall and considering the assumed low future investment results, this increases the effective guarantees for our customers and leads to a higher value of financial options and guarantees as against previous years.

3.6.2 TVFOG in German primary health business

For participating German primary health business, minimum profit-sharing rules are set according to current legal requirements. Management discretion is relevant for the use of free policyholder funds in order to reduce future premium increases necessary to cover the assumed development of healthcare costs. Furthermore, management decisions on how to proceed with changes in technical interest rates are taken into account, subject to legal restrictions.

As detailed analyses show, German primary health business is not exposed to financial options and guarantees since policyholder options are counterbalanced by options of the company. The main reasons are:

- Technical interest rates are not guaranteed for the whole contract term, but can be changed through a premium adjustment process. In the event of an interest-rate reduction, this leads to higher premium rates for the policyholder.
- If future investment returns are expected to be below the guaranteed interest rate, the German Federal Financial Supervisory Authority (BaFin) demands in accordance with the “Aktuarielle Unternehmenszins-Verfahren (AUZ-Verfahren)” a reduction in the interest-rate guarantee which corresponds to premium rate increases.
- In the absence of any surrender values, policyholder options are more limited. Premium increases have been reduced, depending on inflation rates, to reflect potential policyholder behaviour.

3.7 Cost of holding capital

The cost of holding capital consists of the following components which are deducted from the embedded value:

- Cost of double taxation on the required capital (Tax CoC)
- Cost of asset management related to the assets covering required capital (Investment expense CoC)



- Cost of profit sharing of investment income on shareholder funds for German primary health business (CoC for policyholder participation)
- Frictional cost¹ on the embedded value less free surplus to allow for non-financial risks (Frictional CoC)

The frictional cost represents an allowance for non-financial risks not reflected in the market-consistent valuation of the PVIF. The frictional cost parameter is a 100bps spread on the discount rate for all businesses except primary life business in Germany, for which the spread is 50bps. The major portion of risk-based capital for primary life business in Germany is held for adverse capital market risks which are explicitly modelled in the EEV. Thus it is appropriate to reduce the spread which should mainly account for non-modelled non-financial risks and modelling error.

For hedgeable financial risks, it is not necessary to add an allowance for frictional costs where a market-consistent approach has been used. This is because the cost of hedging, as given by the market value of those instruments that the insurer would need to buy in order to fully hedge its position, already includes expected and unexpected loss costs, transaction fees, etc.

3.8 Change in embedded value

The change in embedded value from one valuation date to the next comprises the following elements:

- Embedded value earnings
- Currency movements
- Value of acquired/divested business
- Capital movements

The embedded value earnings are explained in more detail in the following section.

The currency movements represent the impact of changes in currency exchange rates on the embedded value. The embedded value is reported in euros.

The value of acquired/divested business represents the value of business acquired or divested during the reporting year. In this position, the impact of changes in participation rates at the Munich Re Group's subsidiaries is included.

The capital movements are calculated as the amount of capital contributed to covered business less the amount of capital released from covered business during the reporting year.

3.9 Embedded value earnings

The embedded value earnings can be split into the following components:

- Expected return on embedded value
- Experience variances
- Operating assumption changes
- Value added by new business
- Tax variances and tax assumption changes
- Economic variances

¹ This definition of *frictional costs* is in line with the definition that we have used for presenting embedded value results under the framework of the European Embedded Value Principles since the embedded value disclosure 2005. Please note that this definition differs from that given by the Market Consistent Embedded Value Principles[®].



The sum of the first four components of embedded value earnings are referred to as operating embedded value earnings.

The return expectation in a market-consistent framework is based on risk-free interest rates. Therefore, the expected return on embedded value is calculated assuming a risk-free roll-forward of the embedded value at the beginning of the year plus the unwind of the frictional costs included in the embedded value.

The experience variances reflect the difference between the actual operating experience in the reporting year and the operating result assumed in the previous embedded value calculation.

The operating assumption changes reflect the aggregate impact on embedded value caused by changes in the operating assumptions within the reporting year. All operating assumptions are subject to an active review at each valuation date.

The value added by new business is explained in detail in the following section.

The tax variances and tax assumption changes reflect the aggregate impact on embedded value due to changes in tax legislation during the reporting year. All tax assumptions are subject to an active review at each valuation date.

The economic variances summarise the aggregate impact on embedded value caused by changes in the capital market during the reporting year. This includes in particular the impact of changes in interest rates on the value of both assets and liabilities.

3.10 Value added by new business

Value added by new business (VANB) is the present value as at the end of the reporting year of the future regulatory after-tax profits in respect of new business written in the reporting year, reduced by the value of financial options and guarantees and the CoC associated with new business. Additionally, after-tax regulatory profits in respect of this business during the reporting year are included in the reported VANB. The value of new business written in the reporting year is calculated consistently with the methodology outlined in Section 3.5.

For reinsurance business, the value of new business can be calculated on a stand-alone basis, as there are little or no interactions between in-force and new business. For primary insurance business, because of material interactions between existing and new business, a marginal approach is used.

3.11 Operating assumptions

Operating assumptions describe expected future operating experience. They refer mainly to mortality, morbidity, persistency, expenses and in primary insurance business to policyholder participation. The operating assumptions are based on best-estimate assumptions derived from company experience and/or market experience. They are in line with management expectations and reflect recent operating experience of the entities concerned.

All costs related to covered business are split into acquisition, maintenance and investment-related expenses and are fully allowed for in the embedded value. There are no expenses excluded as development costs. We use a going concern approach in line with the European Embedded Value Principles. Future productivity gains are not anticipated in the embedded value calculations.



3.12 Tax assumptions

Taxation assumptions included in the embedded value models reflect local taxation rates and bases, including future changes that are at an advanced stage of legislative implementation. Tax modelling also includes the valuation of existing tax losses carried forward. No withholding taxes on dividends from subsidiaries have been allowed for.

3.13 Economic assumptions

The economic assumptions are derived following a market-consistent valuation approach. A large number of asset classes and economic assumptions are modelled stochastically. This includes equities, bond yields, property, and inflation.

The construction of risk-neutral economic scenarios requires careful calibration to the underlying market parameters to ensure that the valuation replicates the market prices of assets. The key areas for calibration are initial yield curves, implied market-consistent volatilities of all relevant asset classes, and correlations between asset classes. The interest-rate model used considers both parallel shifts and twists to the yield curve.

The economic scenarios have been calibrated to the market conditions at the valuation dates, i.e. risk-free rates, swaption prices and equity option prices. Swap rates are used as an approximation of the risk-free yield curve. The parameters used for year-end 2007 and year-end 2008 are shown in Section 6.4.

The economic scenarios are constructed using a proprietary economic scenario generator developed by Barrie & Hibbert, a financial risk consultancy based in Edinburgh. The Barrie & Hibbert economic scenario generator is widely used in the insurance industry.

3.14 Consolidation

The embedded value results are presented at a consolidated Munich Re Group level. The results are presented net of minority interests and policyholders' interests.

Intra-Group reinsurance ceded from primary insurers to reinsurers is shown in the reinsurance segment.

3.15 Valuation of pension fund liabilities

Pension liability deficits are allowed for in the EV consistently with the valuation under IFRS. Any pension fund deficits are reflected by adjusting the ANW.

3.16 Foreign currency translation

The embedded value reporting currency is the euro. Calculations are undertaken in the original currency of the covered business and converted to euros for consolidation purposes.

In converting original currency embedded values and their components into euros, the exchange rates as at the relevant valuation dates are used. Changes in the embedded value due to changes in foreign exchange rates are disclosed as currency movements, which are excluded from embedded value earnings.

For converting embedded value earnings based on the original currency into euros, average-of-year exchange rates are used.



4 IFRS reconciliation

The embedded value of covered business as at 31 December 2008 exceeds the corresponding IFRS equity (excluding goodwill) by €2,633m, down from €5,450m in the previous year. As the embedded value does not include the value of future new business, goodwill is excluded from the IFRS equity for this comparison.

4.1 Reinsurance

All figures in €m	31.12.2008	31.12.2007
IFRS equity	3,900	4,096
- Thereof goodwill	0	0
IFRS equity excluding goodwill	3,900	4,096
Embedded value	6,116	6,662
Value not recognised in IFRS equity	2,216	2,566

The value not recognised in IFRS equity decreased in 2008 by €350m.

4.2 Primary insurance

All figures in €m	31.12.2008	31.12.2007
IFRS equity	4,308	3,687
- Thereof goodwill	1,217	1,165
IFRS equity excluding goodwill	3,092	2,522
Embedded value	3,509	5,406
Value not recognised in IFRS equity	417	2,884

The value not recognised in IFRS equity decreased in 2008 by €2,467m, mainly driven by the decrease in embedded value in 2008.



5 Sensitivities

Sensitivities of embedded value as at 31 December 2008 and 2008 value added by new business are presented in this section. The presentation follows the Additional Guidance on European Embedded Value Disclosures as published by the CFO Forum in October 2005.

5.1 Reinsurance

Sensitivities for embedded value as at 31 December 2008:

All figures in €m	EV	Difference	Change
Base case	6,116		
Frictional cost rate +100bp	5,469	-647	-11%
No frictional costs	6,887	771	13%
Mortality/morbidity (life business) -5%	7,338	1,222	20%
Mortality (life business) -5%	7,195	1,079	18%
Morbidity (life business) -5%	6,262	146	2%
Mortality (annuity business) -5%	6,096	-20	0%
Mortality (life business) +5%	5,051	-1,065	-17%
Morbidity (life business) +5%	5,968	-149	-2%
No mortality improvements (life business)	3,883	-2,233	-37%
Lapse rates -10%	6,221	104	2%
Lapse rates +10%	6,038	-78	-1%
Maintenance expenses -10%	6,175	59	1%
Value of original currencies -10%	5,616	-501	-8%
Interest rates -100bp	6,559	443	7%
Interest rates +100bp	5,719	-397	-6%
Swaption implied volatilities +25%	6,114	-3	0%
Equity/property implied volatilities +25%	6,091	-25	0%
Minimum solvency capital	6,270	154	3%

Sensitivities for 2008 value of new business:

All figures in €m	VANB	Difference	Change
Base case	356		
Frictional cost rate +100bp	283	-73	-21%
No frictional costs	435	79	22%
Mortality/morbidity (life business) -5%	468	112	32%
Mortality (life business) -5%	449	93	26%
Morbidity (life business) -5%	376	20	6%
Mortality (annuity business) -5%	356	0	0%
Mortality (life business) +5%	265	-91	-26%
Morbidity (life business) +5%	337	-19	-5%
No mortality improvements (life business)	160	-196	-55%
Lapse rates -10%	368	12	3%
Lapse rates +10%	346	-10	-3%
Maintenance expenses -10%	365	9	2%
Value of original currencies -10%	323	-33	-9%
Interest rates -100bp	364	8	2%
Interest rates +100bp	346	-10	-3%
Swaption implied volatilities +25%	356	0	0%
Equity/property implied volatilities +25%	356	0	0%

5.2 Primary insurance

Sensitivities for embedded value as at 31 December 2008:

All figures in €m	EV	Difference	Change
Base case	3,509		
Frictional cost rate +100bp	2,938	-571	-16%
No frictional costs	4,119	610	17%
Mortality/morbidity (life business) -5%	3,557	48	1%
Mortality (annuity business) -5%	3,471	-38	-1%
Mortality (life business) +5%	3,495	-14	0%
Morbidity (life business) +5%	3,497	-12	0%
No mortality improvements (life business)	3,509	0	0%
Lapse rates -10%	3,526	17	0%
Lapse rates +10%	3,506	-3	0%
Maintenance expenses -10%	3,587	78	2%
Value of original currencies -10%	3,514	5	0%
Interest rates -100bp	1,945	-1,564	-45%
Interest rates +100bp	4,477	968	28%
Swaption implied volatilities +25%	3,257	-252	-7%
Equity/property implied volatilities +25%	3,527	18	1%
Minimum solvency capital	3,879	370	11%



Sensitivities for 2008 value of new business:

All figures in €m	VANB	Difference	Change
Base case	-45		
Frictional cost rate +100bp	-65	-20	44%
No frictional costs	-25	20	-45%
Mortality/morbidity (life business) -5%	-48	-3	7%
Mortality (annuity business) -5%	-45	0	0%
Mortality (life business) +5%	-39	6	-14%
Morbidity (life business) +5%	-42	3	-6%
No mortality improvements (life business)	-45	0	0%
Lapse rates -10%	-43	2	-5%
Lapse rates +10%	-54	-9	21%
Maintenance expenses -10%	-35	10	-22%
Value of original currencies -10%	-45	0	0%
Interest rates -100bp	-117	-72	160%
Interest rates +100bp	-5	40	-88%
Swaption implied volatilities +25%	-63	-18	40%
Equity/property implied volatilities +25%	-46	-1	2%



6 Summary of assumptions

6.1 Shareholders' share

%	Shareholders' share Primary insurance	
	31.12.2008	31.12.2007
Germany - life	14*	14*
Germany - Health	15*	15*
Italy	18-20**	18-20**

* On average over the total projection time.

** On average over the total projection time as a fraction of investment return, before the effect of guarantees.

6.2 Tax rates

%	Long-term tax rate			
	Reinsurance		Primary insurance	
	31.12.2008	31.12.2007	31.12.2008	31.12.2007
Germany	33	33	32	32
Italy	32	32	33	33
USA	35	35		
Canada	28	28		
UK	28	28		

6.3 Currency exchange rates

€1 = ... foreign currency	Currency exchange rates		
	31.12.2008	2008 average-year	31.12.2007
USD	1.39005	1.47082	1.46205
CAD	1.71600	1.56161	1.44300
GBP	0.96685	0.79721	0.73445

6.4 Economic assumptions

6.4.1 Risk-free interest rates

The economic scenarios have been calibrated to market conditions at the valuation date. Swap rates have been used as an approximation of the risk-free yield curves.

The table below shows the swap yield curves at the relevant valuation date for the major currencies.

Swap yield curves	31 December 2008				31 December 2007			
	EUR	USD	GBP	CAD	EUR	USD	GBP	CAD
1 year	2.55%	1.29%	2.00%	0.96%	4.75%	4.22%	5.74%	4.89%
2 years	2.76%	1.45%	2.60%	1.07%	4.55%	3.80%	5.22%	4.17%
3 years	2.96%	1.71%	2.85%	1.32%	4.53%	3.90%	5.14%	4.29%
4 years	3.12%	1.96%	3.02%	1.49%	4.53%	4.04%	5.12%	4.39%
5 years	3.24%	2.16%	3.15%	1.61%	4.56%	4.18%	5.09%	4.45%
6 years	3.36%	2.27%	3.24%	1.75%	4.58%	4.31%	5.08%	4.48%
7 years	3.46%	2.36%	3.31%	1.91%	4.61%	4.42%	5.06%	4.51%
8 years	3.57%	2.43%	3.37%	2.09%	4.65%	4.52%	5.04%	4.55%
9 years	3.66%	2.50%	3.41%	2.29%	4.68%	4.59%	5.03%	4.58%
10 years	3.74%	2.57%	3.45%	2.49%	4.72%	4.67%	5.01%	4.61%
15 years	3.90%	2.81%	3.67%	3.18%	4.86%	4.89%	4.92%	4.74%
20 years	3.86%	2.79%	3.58%	3.38%	4.91%	4.98%	4.83%	4.78%
25 years	3.67%	2.71%	3.43%	3.36%	4.91%	5.02%	4.74%	4.76%
30 years	3.54%	2.72%	3.32%	3.32%	4.89%	5.03%	4.67%	4.73%

For interpolation a regression spline technique is used and extrapolation is done by the Nelson-Siegel form.

6.4.2 Volatilities

The interest rate scenarios have been generated so that they replicate at-the-money swaption prices with a swap tenor of 20 years. The implied volatilities for these swaptions are outlined in the following table:

Target swaption implied volatilities*	31 December 2008		31 December 2007	
	EUR	USD	EUR	USD
1 year	36.40%	48.70%	11.80%	19.80%
2 years	31.10%	41.50%	11.50%	18.20%
3 years	28.50%	37.80%	11.40%	17.40%
4 years	26.60%	35.00%	11.20%	16.60%
5 years	25.30%	32.80%	11.10%	15.80%
10 years	24.00%	25.50%	10.50%	13.30%
15 years	26.80%	24.50%	10.20%	12.60%
20 years	28.50%	22.70%	9.90%	12.40%
30 years	25.00%	21.60%	9.50%	11.70%

* For at-the-money swaptions with a 20-year tenor.



The equity models have been calibrated to prices of at-the-money ten-year European equity index options observed in the OTC market. The implied volatilities of these option prices are shown in the table below.

Target equity implied volatilities	31 December 2008		31 December 2007	
	EURO STOXX	S&P 500	EURO STOXX	S&P 500
Equity index	34.3%	35.2%	27.3%	25.9%

Given the long-term nature of the financial risks embedded in life insurance contracts, the implied volatilities of swaptions and equity options of the longest available maturities have been taken as target volatilities.

6.4.3 Correlation coefficients

Correlation assumptions are estimated from historic market data. The relevant correlation assumptions between the change of one-year bond yields and equity returns are displayed in the table below.

	One-year EUR bond yield	EURO STOXX
One-year EUR bond yield	1.000	-0.196
EURO STOXX		1.000

	One-year USD bond yield	S&P 500
One-year USD bond yield	1.000	-0.189
S&P 500		1.000



7 Independent Assurance Report

Introduction

Based on the engagement letter dated 20 October 2008 we have been engaged to audit the European Embedded Value (EEV) of Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft, München, (MR) as at 31 December 2008 as stipulated in the accompanying EEV Report of MR. MR is responsible for the preparation of the EEV Report including the calculation of the EEV. This includes particularly setting the operative and economic assumptions, the explanation concerning the determination of the EEV and its roll-forward, the implementation and the operativeness of the system which ensures the completeness and correctness of the data which are necessary for the calculation of the EEV. Our responsibility is to express an opinion on the calculation of the EEV as to whether the methodology and the assumptions used comply with the European Embedded Value Principles as published by the CFO Forum on 5 May 2004 and 31 October 2005 (Embedded Value Principles).

Subject matter and criteria

For the calculation of the EEV MR applies criteria as set out in the European Embedded Value Principles. The calculation of European Embedded Values is necessarily based on numerous assumptions with respect to economic conditions, operating conditions, taxes, and other matters. Many of these are beyond of the Companies control. Actual cash flows in the future are likely to be different from those assumed in the calculation and such variation may be material.

Work performed

We conducted our audit of the EEV in accordance with the International Standard on Assurance Engagements (3000): "Assurance engagements other than audits or reviews of historical financial information", issued by the International Auditing and Assurance Standards Board. The effectiveness of the accounting-related internal control system in the EEV calculation is examined primarily on a test basis within the framework of the audit. The audit includes assessing the EEV principles used and significant estimates and assumptions made by management. As a result of determining our audit strategy and audit objectives, we have established Embedded Value Principles 3, 9, 10, 11 as the special focus of our audit.

We believe that our audit provides a reasonable basis for our opinion.

Regarding our independence, we comply with the requirements of the IFAC Code of Ethics for Professional Accountants.

Conclusion

In our opinion, the methodology and the assumptions used comply with the European Embedded Value Principles and in particular that:

- The calculated EEV is the present value of shareholders' interests in the earnings distributable from assets allocated to the covered business after sufficient allowance for the aggregate risks in the covered business. Section 3 sets out the methodology of making allowance for the aggregate risks. In particular, by the use of
 - a level of required capital derived from internal risk models and additional regulatory restrictions;
 - a market-consistent assessment of the time value of financial options and guarantees; and



- a deduction for cost of capital based on the cost of double taxation, investment expenses and policyholder participation on the required capital plus frictional costs on the embedded value less free surplus.
- The operating assumptions have been set with appropriate regard to past, current and expected future experience.
- The economic assumptions used are internally consistent and consistent with observable market data.
- For the primary participating business, the assumed bonus distribution, asset allocation, allocation of profit between policyholders and shareholders, and other management actions are consistent with other assumptions used in the projections, and with local market practice.
- KPMG has also performed limited high-level checks on the results of the calculations. KPMG has not, however, performed detailed checks on all the models and processes involved.

We have provided the services described above on behalf of Münchener Rückversicherungs-Gesellschaft Aktiengesellschaft, München. We have carried out our engagement on the basis of the General Engagement Terms included in our engagement agreement dated as of 1 January 2002. By taking note of and using the information as contained in our Assurance Report, each recipient confirms to have taken note of the terms and conditions stipulated in the aforementioned General Engagement Terms (including the liability limitations to €4m for negligence specified in item No. 9 included therein) and acknowledges their validity in relation to us.

Cologne, 27 February 2009



8 Glossary

Acquired (divested) business	Business acquired (divested) through acquisition (sale) of stakes in insurance or reinsurance companies
Adjusted net worth (ANW)	Also known as shareholders' net worth or adjusted net asset value (ANAV)
Best estimate assumption	An assumption that represents the expected outcome from the range of possible outcomes of future experience
Capital movements	Dividends and capital contributions
CoC for policyholder participation	Cost of profit sharing of investment income on shareholder funds for German primary business
Cost of holding capital (CoC)	Represents the cost of holding capital and includes an explicit allowance for non-financial risks
Covered business	The business for which the embedded value is reported
Currency movements	Aggregate impact of currency movements on the embedded value
Economic assumptions	These include risk-free interest rates, discount rates, inflation rates and assumptions on the volatility of economic parameters
Economic variance	Is the sum of the difference between projected and actual investment return in the reporting year and effects on embedded value from changes in capital market parameters
Embedded value	Present value of shareholders' interests in the earnings distributable from assets allocated to covered business after sufficient allowance for the aggregate risks in covered business
Embedded value components	The embedded value consists of the following three components: <ul style="list-style-type: none">• Present value of future shareholder cash flows from in-force covered business (PVIF)• Cost of holding capital (CoC)• Adjusted net worth (ANW)



Embedded value earnings	<p>Operating embedded value earnings are the total of the following components:</p> <ul style="list-style-type: none">• Expected return• Experience variances• Operating assumption changes• Value added by new business <p>Total embedded value earnings are the sum of the following components:</p> <ul style="list-style-type: none">• Operating embedded value earnings• Tax variances and tax assumption changes• Economic variances
European Embedded Value Principles	<p>A set of principles for embedded value reporting developed by the CFO Forum. The CFO Forum is a high-level discussion group attended by the Chief Financial Officers of major European insurance companies. The Munich Re Group is a member of the CFO Forum.</p>
Expected return	<p>The expected return on embedded value is calculated as the risk-free roll-forward of the embedded value at the beginning of the year plus the unwind of the frictional costs included in the embedded value</p>
Experience variances	<p>The impact on embedded value of differences between the actual operating experience in the reporting year and the operating result assumed in the previous embedded value calculation</p>
Free surplus	<p>Amount of capital allocated to the business in excess of the required capital</p>
Frictional CoC	<p>Represents an allowance for non-financial risks and is comparable to the <i>cost of residual non hedgeable risks</i> as defined in the Market Consistent Embedded Value Principles[®]</p>
Frictional cost rate	<p>Annual cost rate used to calculate the frictional cost of capital</p>
IFRS	<p>International Financial Reporting Standard</p>
Investment expense CoC	<p>Present value of the investment expenses related to the assets covering required capital</p>
Look-through basis	<p>A basis via which the impact of an item on the whole Munich Re Group is measured, rather than on a particular part</p>



Operating assumption changes	Aggregate impact of changes in the operating assumptions on the embedded value
Operating assumptions	Operating assumptions include: <ul style="list-style-type: none">• Mortality• Morbidity• Persistency• Expenses• Policyholder participation in primary insurance
Operating embedded value earnings	See Embedded value earnings
Operating experience	Experience from operating assumptions
Participating business	Primary insurance business in which policyholders have the right to participate in the performance of a specified pool of assets or contracts
Present value	The value of a future cash flow at the valuation date, discounted at a discount rate applicable to that cash flow
Present value of in-force business (PVIF)	Present value of future shareholder cash flows projected to emerge from the assets backing liabilities of the in-force covered business (PVIF). This value is reduced by the value of financial options and guarantees.
Present value of new business premiums (PVNBP)	Present value of future premiums from new business
Reporting currency	The embedded value reporting currency is the euro.
Required capital	The amount of surplus assets whose distribution to shareholders is restricted
RfB	The “Rückstellung für Beitragsrückerstattung (RfB)” is the provision for premium refunds in German primary insurance
Risk-free (interest) rates	Prospective yields on securities considered to be free of default or credit risk
Statutory basis	Valuation basis used for reporting financial statements to local regulators



Tax CoC	Cost of investment returns on assets covering required capital being taxed in the insurer's hands
Tax variances and tax assumption changes	Aggregate impact of changes in the tax legislation on the embedded value
Time value of financial options and guarantees (TVFOG)	The time value of financial options and guarantees is part of the PVIF, the PVIF before deduction of the allowance for the time value of financial options and guarantees reflects the intrinsic value of financial options and guarantees