



**PZU GROUP**

**EUROPEAN**

**EMBEDDED VALUE**

**AT 31 DECEMBER 2010**

16 MARCH 2011

# EUROPEAN EMBEDDED VALUE AT 31 DECEMBER 2010

## PZU GROUP

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# **1 INTRODUCTION**

## **1.1 DEFINITION OF EMBEDDED VALUE**

Embedded value is a valuation approach which focuses on the value to shareholders of expected future distributable earnings arising from an insurance company's in-force business, allowing for the risks to shareholders arising from uncertainty in the timing and amount of expected future distributable earnings. Embedded value reporting also focuses on the analysis of movement in shareholder value during a specific reporting period (referred to in this report as the "analysis of embedded value earnings"), including the contribution arising from the sale of new business policies during a given reporting period.

## **1.2 EEV PRINCIPLES**

The embedded value of the PZU Group has been calculated in accordance with the European Embedded Value (EEV) Principles published in May 2004 and October 2005 by the European Insurance CFO Forum, which represents the chief financial officers of major European insurers. Certain aspects of the Group's EEV calculation have been reviewed by Towers Watson in its capacity as consulting actuaries to the Group. Towers Watson's opinion sets out the scope of the review and the resulting opinion. Towers Watson's report is included in section 9.

The EEV of the Group is calculated using a market-consistent framework which is a particular approach to embedded value where assets, liabilities and future cash flows are valued consistently with each other, and in line with market prices of financial instruments with similar characteristics. This approach seeks to ensure that the risk inherent within the projected cash flows is calibrated to the market price for risk where this is reliably observable.

## **1.3 COVERED BUSINESS**

For the purposes of EEV reporting, a distinction is drawn between "covered business" to which the EEV methodology is applied, and "non-covered business" which has been reported on an unadjusted IFRS net asset value basis. EEV in respect of the covered business is referred to as Life and Pensions EEV.

The Group defines its covered business as contracts written in the two entities, Powszechny Zakład Ubezpieczeń na Życie S.A. ("PZU Life" or "Life") and Powszechnie Towarzystwo Emerytalne PZU S.A. ("PZU PTE" or "Pensions"). The covered business includes group whole of life, group yearly renewable term, individual continuation of group coverage ("continued business"), traditional life, unit linked, bancassurance deposit business and pension business. The definition of covered business leads to a difference between the segments used for EEV reporting and those used for IFRS reporting, in relation to business classified as investment contracts for IFRS purposes. Investment contracts are excluded from the IFRS Life segment and Pensions segment upon IFRS consolidation and are classified in the asset management segment under IFRS. However, these contracts are included in the Life and Pensions EEV.

The Group's non-covered business includes general insurance in Powszechny Zakład Ubezpieczeń S.A. (PZU SA), asset management and other service activities as well as relatively small life insurance subsidiaries in Ukraine and Lithuania.

# **2 METHODOLOGY AND COMPONENTS OF LIFE AND PENSIONS EEV**

The Life and Pensions EEV consists of the aggregate of the shareholders' adjusted net worth and the value of in-force business relating to covered business.

## **2.1 SHAREHOLDERS' ADJUSTED NET WORTH**

The shareholders' adjusted net worth (SNW) is defined as the market value of assets allocated to the covered business not required to back the in-force regulatory liabilities at the valuation date. The shareholders' adjusted net worth is calculated by the Group on the basis of the local regulatory surplus, with appropriate adjustments applied. These adjustments are primarily to eliminate intangibles and mark all assets and liabilities to market value.

A reconciliation of the shareholders' adjusted net worth and the IFRS shareholders' equity is provided in section 4.5.

The shareholders' net worth is comprised of required capital and free surplus. The required capital is the market value of assets attributed to the covered business over and above that required to back liabilities for covered business, whose distribution to shareholders is restricted. The Group defines the required capital as the higher of the Solvency I regulatory required capital and an amount sufficient to obtain a AA rating from Standard and Poor's. For PZU Life the required capital for the embedded value at year-end 2010 was set to 250% of the regulatory required capital (200% in EEV 2009), while for PZU PTE a rating agency formula was used leading to a required capital level equivalent to approximately 0.5% of assets under management at year-end 2010.

The free surplus is the market value of any capital and surplus allocated to, but not required to support, the in-force covered business at the valuation date.

## **2.2 VALUE OF IN-FORCE COVERED BUSINESS**

The in-force covered business portfolio consists of policies underwritten by the Group prior to the valuation date excluding future new business (see section 2.3.4).

Distributable profits generally arise when they are released following actuarial valuations. These valuations are carried out in accordance with local regulatory requirements designed to ensure and demonstrate solvency. Future distributable profits will depend on actual experience in a number of areas such as investment return, lapses, mortality, administration expenses, taxation, as well as management and policyholder actions. Releases to shareholders in future years arising from the in-force covered business and associated required capital can be projected using assumptions of future experience.

The value of in-force covered business (VIF) is the value arising from the run-off of the existing in-force portfolio, and consists of:

- The present value of future profits (PVFP);
- The time value of financial options and guarantees (TVOG);
- The frictional costs of required capital (FCRC); and
- The cost of non-hedgeable risks (CNHR).

The methodology used to calculate each of these components is set out below.

### **2.2.1 PRESENT VALUE OF FUTURE PROFITS**

The PVFP is the present value of the future profits distributable to shareholders arising from the in-force covered business

In theory, a market-consistent valuation requires each individual cash flow to be valued separately in line with its specific risk profile, so as to maintain consistency with the market prices of cash flows with similar risk profiles traded in the open markets. However, there are a number of techniques in economic theory that can be applied to reduce the complexity in such an approach, including certainty-equivalent valuation techniques. Certainty-equivalent approaches look to address the practical

difficulties in valuing each individual cash flow with a different discount rate by adjusting the individual cash flows for risk, by removing the effects of asset risk premia and thus projecting risk-adjusted returns at the risk-free reference rate, which then allows the resulting stream of risk-adjusted profits to be discounted at the same risk-free reference rate. The certainty-equivalent technique is an approach commonly used in the pricing of financial instruments.

Future profits are projected using best estimate non-economic assumptions and market-consistent economic assumptions. The PVFP is calculated using the certainty-equivalent approach, under which the same reference rate is used for both the projected investment return and the discount rate, ensuring that asset values are consistent with the observed market prices of these assets. The PVFP includes the unrealised capital gains and losses on the assets allocated to back the in-force regulatory liabilities at the valuation date.

## **2.2.2 TIME VALUE OF FINANCIAL OPTIONS AND GUARANTEES**

The PVFP calculation is based on a single, deterministic economic scenario. A single scenario does not necessarily capture the full impact of the presence of financial options and guarantees in insurance contracts, which can give rise to asymmetric shareholder profits, since the negative impact of adverse scenarios can outweigh the positive impact of beneficial scenarios. Although the intrinsic value of such financial options and guarantees is already allowed for directly in the PVFP via the profits projected in the base deterministic scenario, more sophisticated techniques are required to capture the so-called "time value" arising from the asymmetric impacts of future investment returns on shareholders' profits.

Stochastic modelling techniques are used to assess the impact of many alternative future outcomes. The difference between the intrinsic value and the average value over all scenarios is referred to as the time value of financial options and guarantees (TVOG).

Stochastic modelling of financial options and guarantees typically involves projecting the future cash flows of the business under numerous market-consistent economic scenarios. The Group used one thousand market-consistent economic scenarios. Under a market-consistent approach, the economic scenarios generated are based on market prices of observable financial instruments such as bond yields, equity options and swaptions.

For the Group the asymmetric impact where the negative impact of adverse scenarios outweighs the positive impact of beneficial scenarios can occur for two types of business, namely traditional life with-profit business with guaranteed minimum investment returns and pensions business. On Pension business, asymmetries arise from the guaranteed benchmark investment returns and the regulatory cap on management fees.

## **2.2.3 FRICTIONAL COSTS OF REQUIRED CAPITAL**

The FCRC are the additional costs to the shareholders of holding the assets backing required capital within an insurance company. The additional costs allowed for as FCRC are the taxation costs and any additional investment expenses on the assets backing the required capital. FCRC are payable on the assets backing required capital up until the point that they are released to shareholders. These cash flows are then discounted at the reference rate.

## **2.2.4 COST OF NON-HEDGEABLE RISKS**

The EEV Principles require sufficient allowance to be made for the aggregate risks in the covered business. Sufficient allowance for certain risks may not have been made within the PVFP, TVOG and FCRC. These include an allowance for uncertainty in the best estimate of the cash flows related to non-hedgeable risks, including mortality, lapse, expense and operational risk, and an allowance for the cost of non-hedgeable financial risk which arises from calibrating to the Polish Treasury bond curve, recognising that this market is not deep and liquid at longer durations.

The Group has allowed for the CNHR by applying a cost of non-hedgeable risk capital approach to the valuation of the covered business. The cost of non-hedgeable risk capital each year is defined as a

fixed per annum charge that is applied to the covered business non-hedgeable risk capital (NHR capital). The fixed per annum charge is disclosed in section 3.1.3

The covered business NHR capital at the valuation date has been calculated using a value-at-risk approach consistent with a 99.5% confidence level over a one-year time horizon. The non-hedgeable risks that have been considered by the Group for this purpose include mortality, lapse, expense, operational and extrapolation of the yield curve.

The NHR capital calculation allows for the reduction in NHR capital as a result of diversification between different non-hedgeable risks. No diversification between hedgeable and non-hedgeable risk has been allowed for.

The NHR capital is projected over the lifetime of the in-force business based on appropriate risk drivers. The CNHR is calculated as the present value, discounted at the reference rate, of the projected cost of non-hedgeable risk capital for each year of the projection.

## **2.3 ADDITIONAL MATTERS RELATING TO THE LIFE AND PENSIONS EEV METHODOLOGY**

### **2.3.1 LIFE AND PENSIONS PRODUCT DETAILS**

This section briefly describes some key aspects of certain products written by the Group due to their unique nature.

The key product written by PZU Life is the Group P product which has certain unique characteristics compared to standard group life business. In particular, it provides insurance cover for employees and their family members and all insureds within a particular employer/group are charged identical premium rates. An insured, upon exiting the employer/group, generally has the option to continue the insurance on an individual basis (continuation option).

Continued business is whole life insurance for persons, and their co-insureds, who were previously members of Group P schemes, or its previous form known as Type D, and who exercised their continuation option upon exit from their group scheme. The valuation methodology for continued business follows the same approach as that for individual business.

The unit-linked business includes products sold on an individual and group basis. These products generally have relatively little additional life insurance cover.

The Group also writes short-term investment business which primarily comprises endowments of duration one-year.

### **2.3.2 TREATMENT OF GROUP LIFE BUSINESS**

The group life business consists primarily of two types of scheme, those with an unlimited term with annual policyholder cancellation rights ("group whole life") and those with a yearly renewable term. In projecting the expected future cash flows, different approaches are taken for the two types of scheme, as described below.

The cash flow projections for group whole life business are based on an estimated profile of the insureds obtained from a study of the group business. The cash flow projections reflect the age and gender of the primary member and their co-insureds based on the profile of the business. The expected future cash flows for group whole life business are projected for the full embedded value projection term, based on the current premium rate level. This approach is consistent with the valuation of regulatory reserves, where the sum assured and premium rate are considered as whole life guarantees. It is expected that the policyholders will increase their premiums and sum assured at the same rate. The continuation option is assumed to be exercised at the current state retirement age of 65 years for men and 60 years for women. The assumed lapse rates reflect the net impact of members exiting existing schemes and new members joining these schemes. The projection for group whole life business assumes the average age of the business increases by one year per annum.

The cash flow projections for yearly renewable term business are performed for the whole portfolio on an aggregate basis, rather than projecting the benefits for single insured/co-insureds individually. The expected future cash flows for yearly renewable term business are projected for eight years from the valuation date. The projection term reflects management expectations about the duration and reasonable predictability of this business. The assumed lapse rates reflect the net impact of members exiting existing schemes and new members joining these schemes. A proportion of portfolio members are expected to continue their insurance coverage after they leave the schemes. The “continuation rates” reflect the behaviour of individuals who exit existing schemes and exercise their continuation option, and the projected profits from group business include the expected post-continuation cash flows in respect of these individuals on a basis consistent with the projections for individual continued business. At the end of eight years all remaining group business is assumed to lapse while the expected post-continuation cash flows continue to be projected for the full embedded value projection term. In principle, the projection for yearly renewable term business assumes a constant average age over the projection term. The assumed lapse rates for rider benefits are consistent with the assumptions for the yearly renewable term business.

In projecting the expected future cash flows for yearly renewable term business it is assumed that, in the initial years of the projection, there is a higher increase in the average sum assured than in the premium each year, based on management expectations.

The embedded value does not include allowance for potential future conversion of schemes from whole life to yearly renewable term.

### **2.3.3 TRADITIONAL PARTICIPATING BUSINESS**

Participating business provides policyholders who hold investment based life insurance products with a “bonus” increment to policyholder benefits. This process is also known as profit-sharing. In the general policy conditions for traditional life with-profit business, PZU Life has guaranteed minimum profit-sharing of 85% of the difference between the earned and technical rates.

Future regular bonuses on participating business are projected in a manner consistent with current bonus rates and expected future returns projected in the model on assets deemed to back the policies.

The traditional life with-profit business includes interest rate guarantees arising from the stated technical rate and guaranteed surrender values. Profit-sharing rules combined with the interest rate guarantees result in asymmetric returns for shareholders when comparing favourable and adverse scenarios.

There are no projected residual assets at the end of the projection period.

### **2.3.4 NEW BUSINESS**

The new business value (NBV) is the value of the expected future profit arising from the new business written during the reporting period.

For group business, new business is defined as new schemes only.

For products sold to individuals, new business is defined as new policies sold during the reporting period. This includes new riders sold to individuals who were previously part of a group scheme and as a result of exercising their continuation option upon exit from the scheme they are now in-force individual continued business.

In-force business includes individuals who exercise their continuation option upon exit from a group scheme and new individuals joining existing group schemes. Similarly, new riders sold to members of existing group schemes are not considered as new business but treated as an element of natural transformations within the group portfolio.

The new business value consists of the VIF of new business at the end of the period, calculated using end-period assumptions, plus the regulatory profit/loss result of the business during the period, which includes the impact of all acquisition-related costs. For further details of the relevant assumptions see section 3.

### **2.3.5 NEW PENSION LAW REGARDING PENSION CONTRIBUTIONS**

At the end of 2010 the Polish government proposed amendments to the form of the pension system in Poland. In relation to PTE, a substantial reduction of the contributions transferred to pension funds (OFE) was recommended. As of now, these reforms are at the stage of discussions and consultations in Poland and the final form of the second pillar of the Polish pension system has not been finally determined. Therefore no allowance for this change was made in the 2010 EEV.

## **3 ASSUMPTIONS**

This section describes certain key assumptions used by the Group in preparing the embedded value results and includes a summary of the key assumptions used.

The projection assumptions used to value new business are consistent with those used to value in-force business.

### **3.1 ECONOMIC ASSUMPTIONS**

The economic scenarios have been calibrated to the market conditions at the valuation dates.

#### **3.1.1 REFERENCE RATES**

The reference rate is based on unadjusted Polish Treasury bond yields. The Group uses these rates for consistency with its risk management strategy and it also believes that Polish Treasury bonds are more liquid than swaps in Poland. The Polish Treasury bond yield curve as published by Reuters is available for a maximum of 30 years, with market data available for many interim periods. The Group extrapolates this yield curve beyond 30 years by assuming the spot yield curve remains constant for longer durations.

The table below sets out the reference rates used in the Life and Pensions EEV at each valuation date.

**TABLE 3.1**  
**SUMMARY OF REFERENCE RATES**

#### **Spot yields (%)**

<b>Term</b>	<b>31 December 2010</b>	<b>31 December 2009</b>	<b>31 December 2008</b>
1	4.22	4.18	5.51
2	4.72	4.77	5.39
3	5.00	5.25	5.34
4	5.28	5.62	5.30
5	5.50	5.93	5.31
6	5.65	6.06	5.52



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## SUMMARY OF REFERENCE RATES

### Spot yields (%)

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Term	31 December 2010	31 December 2009	31 December 2008
7	5.81	6.16	5.62
8	5.96	6.23	5.65
9	6.10	6.29	5.61
10	6.21	6.33	5.55
20	6.15	6.35	5.28
30+	6.09	6.21	5.38

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### 3.1.2 CALIBRATION OF ECONOMIC SCENARIOS USED IN TVOG

In running its stochastic models, the Group generates 1,000 economic scenarios which enable models to capture the impact of possible changes to both the slope and level of the yield curve and the prices of bonds, equities and derivatives thereof in future periods. The models simultaneously project all relevant asset classes, namely cash, government bonds and equities.

Stochastic models are calibrated to implied swaption and equity option volatility levels at the valuation date. The interest rate scenarios have been generated so that they replicate the implied volatility of Polish Złoty at-the-money swaptions with a swap tenor of 10 years. The equity models have been calibrated to prices of at-the-money ten-year equity index (WIG20) options observed in the OTC market (EEV 2009) and average historical volatility (EEV 2010). PZU Group used the historical volatility for EEV 2010 due to lack of medium- or long-term equity index options at year-end 2010 in the Polish market. Correlation assumptions implicit within the economic scenario generator model are set with regard to historical experience and general market practice within Poland and Europe. A constant correlation assumption between equities and government bonds of 40% is assumed.

### 3.1.3 COST OF NON-HEDGEABLE RISKS

Covered business NHR capital reflects the amount of capital, determined by considering value-at-risk including TVOG, needed in case an extreme event occurs for a certain risk category. For each individual risk type extreme events are identified, based on historical data, trend analysis and professional judgment, which are expected to occur once in two hundred years. In other words, the NHR capital is calibrated to a 99.5% one year value-at-risk event. Note that while the reported PVFP less TVOG is based on expected cash flows, the amount of NHR capital reflects that needed to withstand the same risks under extreme events.

The NHR capital calculation allows for the reduction in NHR capital as a result of diversification between different non-hedgeable risks, but no diversification between hedgeable and non-hedgeable risk has been allowed for.

The after-tax fixed per annum charge applied to the projected amount of NHR capital as it runs off each year is 4.5%.

### 3.1.4 INFLATION

The inflation rate is set with regard to current data for consumer price and salary inflation and the Group's assessment of long term rates and is reviewed regularly. The assumed consumer price

inflation rate has been set at 2.5% and 2.4% per annum for 2010 and 2009 year-ends, respectively. The assumed expense inflation rate has been set at 125% of the inflation rate i.e. an expense inflation rate of 3.1% per annum for year-end 2010.

The assumed real wage inflation rate has been set at 3% per annum for every valuation date, resulting in an assumed nominal wage inflation rate of 5.5% per annum for the 2010 year-end.

### **3.2 ECONOMIC ASSUMPTIONS USED FOR OPERATING EARNINGS AND IMPLIED DISCOUNT RATES**

For the calculation of expected returns in excess of the reference rate, investment returns which reflect management's expectations of the business are applied for the projection of investment income.

For fixed interest investments, the expected return is based on the one-year reference rate at the start of the reporting period. The nominal rate of return on equities of 9.6%% and 10.3% was assumed for 2010 and 2009 year-ends, respectively.

The implied discount rate (IDR) is the risk discount rate which, when used within a Traditional Embedded Value approach using investment risk premiums in the projections (net of traditional cost of required capital, with no explicit allowance for the TVOG or CNHR) gives the same value as that arising from the Life and Pensions EEV approach (net of the TVOG, FCRC and CNHR).

For the 2010 year-end IDR and Traditional Embedded Value sensitivity calculations, the expected return assumptions for fixed interest investments were consistent with those used in the EEV.

### **3.3 NON-ECONOMIC ASSUMPTIONS**

#### **3.3.1 DEMOGRAPHIC ASSUMPTIONS (INCLUDING LAPSES AND MORTALITY)**

Assumptions are made in respect of future levels of mortality, morbidity, lapses, continuation option take-up and withdrawals. The assumptions reflect management's best estimates of the likely future experience, and are based on the Group's recent experience and relevant population data, where available.

In particular, the assumptions for future mortality rates for pensions, individual life and group whole life business are based on standard Polish mortality tables published by the Polish Central Statistical Office (GUS). The claim assumptions for group life yearly renewable term business are based on recent experience for all group business and reflect the expected future development of the business in line with management's business plan.

For the group business, a level lapse rate reflecting the net effect of movements within the group portfolio is assumed, in line with recent experience of the Group. For continued business, age-dependent lapse rates are assumed, based on recent analyses of the Group. The assumed lapse rates for other lines of business, including pensions, are policy-year dependent, in line with recent experience of the Group.

The continuation option take-up rates of the group yearly renewable term business have been assumed in line with recent experience of the Group.

#### **3.3.2 EXPENSE ASSUMPTIONS**

All management expenses attributed to covered businesses have been included in the Life and Pensions EEV calculations and split between expenses relating to the acquisition of new business, maintenance of in-force business and one-off expenses. Future expense assumptions include an allowance for maintenance, asset management and claim settlement expenses. For the 2010 year-end, a new expense allocation model has been implemented, reflecting the new organizational structure of the Group and its processes. Certain expenses have been identified separately and

charged as incurred rather than being included in the in-force projection. These include certain regulatory expenses, contribution to a special purpose fund and asset transactions costs as well as some project expenses of an exceptional nature, totalling PLN ca. 140 million.

No future productivity gains have been taken into account. Maintenance expenses expressed as per-policy amounts have been inflated in the projections by the relevant expense inflation assumptions.

Expenses arising in PZU SA have not been allowed for in the Life and Pensions EEV. PZU Group deems that the proportion of these that relate directly to acquiring or maintaining covered business is immaterial.

### **3.3.3 INDEXATION OF PREMIUM AND SUM INSURED**

The sum insured for group whole life business is assumed to increase at the same rate as for premiums, while the premium rate discounts for group yearly renewable term business assumed in the initial years of the projection stabilise in later years in line with the company's business plan.

For continued and group business, future premiums are expected to increase at fixed rates per annum based on recent portfolio experience and best estimates of the likely future experience.

For traditional participating business the indexation rates are assumed to be in line with profit-sharing rules.

For unit-linked life business sold in a form of group pension plans, future premiums are assumed to increase in line with expected long-term Polish wage inflation. The projection of remaining unit-linked products assumes premium increases at a level in-line current experience.

For pension business, future premiums are assumed to increase at age dependent rates consistent with the Group's past experience.

### **3.3.4 PENSIONS BUSINESS PREMIUM VOLUMES**

The volumes of the in-force business and new business for each reporting period have been estimated based on the contributions due from the Polish Social Insurance Institution (ZUS).

## **3.4 TAX ASSUMPTIONS**

The corporate tax rate assumptions used in the projection of the distributable earnings at each valuation date has been set to the Polish corporate tax rate of 19%.

# **4 EMBEDDED VALUE RESULTS**

## **4.1 GROUP EEV**

The Group EEV incorporates the value of both the Life and Pensions EEV, as calculated under the assumptions set out above, and the value of the remainder of the Group, the non-covered business, valued on the basis described below (the Group EEV). The table below shows the summary statement of the Group EEV as at 31 December 2010, 2009 and 2008.

**TABLE 4.1**  
**GROUP EEV**

**PLN million**

	<b>2010</b>	<b>2009</b>	<b>2008</b>
Covered business	19,329	20,351	19,347
Non-covered business	6,059	3,556	13,677
<b>Group EEV</b>	<b>25,388</b>	<b>23,907</b>	<b>33,024</b>

The main driver of the change in Group EEV in 2010 was a retention of a substantial part of 2010 profits within the Group.

## **4.2 COVERED BUSINESS – LIFE AND PENSIONS EEV**

The table below shows the components of the Life and Pensions EEV, split by type of business. The Life EEV includes a consolidation adjustment in respect of the Pension business.

**TABLE 4.2**  
**LIFE AND PENSIONS EEV**

**PLN MILLION**

	<b>Life</b>			<b>Pensions</b>			<b>Total</b>		
	2010	2009	2008	2010	2009	2008	2010	2009	2008
Required capital	4,245	3,278	3,469	152	127	110	4,397	3,405	3,579
Free surplus	1,998	3,898	2,240	129	195	202	2,127	4,093	2,442
PVFP	12,116	12,581	13,025	2,866	2,577	2,919	14,982	15,158	15,943
TVOG	-14	-8	-32	-76	-190	-405	-90	-198	-437
FCRC	-423	-374	-371	-44	-40	-34	-467	-414	-405
CNHR	-1,325	-1,449	-1,428	-295	-244	-348	-1,620	-1,692	-1,776
<b>Total</b>	<b>16,596</b>	<b>17,926</b>	<b>16,902</b>	<b>2,733</b>	<b>2,425</b>	<b>2,445</b>	<b>19,329</b>	<b>20,351</b>	<b>19,347</b>

The analysis of embedded value earnings of the Life and Pensions EEV is provided in section 4.6.

A split of the Life and Pensions EEV per line of business is shown below.

**TABLE 4.3**  
**LIFE AND PENSIONS EEV PER LINE OF BUSINESS**

**PLN MILLION**

	<b>2010</b>	<b>2009</b>	<b>2008</b>
Group and continued business <sup>(1)</sup>	12,562	12,268	12,722
Participating, unit-linked and deposits <sup>(1)</sup>	2,037	1,760	1,940
Pensions <sup>(1)</sup>	2,603	2,230	2,243
Free surplus	2,127	4,093	2,442
<b>Total</b>	<b>19,329</b>	<b>20,351</b>	<b>19,347</b>

(1) Includes required capital for line of business

### **4.3 NON-COVERED BUSINESS**

The Group's non-covered business includes its general insurance, asset management and other service activities as well as life insurance subsidiaries in Ukraine and Lithuania. Consolidation adjustments between covered and non-covered business are included in the non-covered business.

The non-covered business has been reported on an unadjusted IFRS net asset value basis.

No adjustment has been for minorities on grounds of materiality.

### **4.4 GROUP EEV ANALYSIS OF EARNINGS**

The Group EEV earnings are driven by Life and Pensions EEV earnings and the IFRS earnings on non-covered business (see section 4.6).

The table below gives an overview of the Group EEV analysis of earnings for the year ending 31 December 2010.

**TABLE 4.4****GROUP EEV ANALYSIS OF EARNINGS YEAR ENDING 31 DECEMBER 2010****PLN MILLION**

	<b>Covered Business</b>		<b>Non-Covered Business</b>	<b>Group EEV</b>
	<b>Life</b>	<b>Pensions</b>		
Opening Group EEV	17,926	2,425	3,556	23,907
Operating Earnings	1,747	188	383	2,317
Non-Operating Earnings	-73	236	-43	121
<b>Total Earnings</b>	<b>1,674</b>	<b>424</b>	<b>340</b>	<b>2,438</b>
Capital and dividend flows	-3,003	-117	2,178	-942
Foreign exchange variances	-	-	-15	-15
<b>Closing Group EEV</b>	<b>16,596</b>	<b>2,733</b>	<b>6,059</b>	<b>25,388</b>

#### **4.5 RECONCILIATION FROM IFRS SHAREHOLDERS' EQUITY TO LIFE AND PENSIONS EEV SHAREHOLDERS' ADJUSTED NET WORTH**

The table below shows the reconciliation between the Group IFRS shareholders' equity and the Life and Pensions EEV shareholders' adjusted net worth.

**TABLE 4.5****NET WORTH RECONCILIATION****PLN MILLION**

	<b>2010</b>	<b>2009</b>	<b>2008</b>
IFRS shareholders' equity	12,800	11,267	20,052
Shareholders' equity of non-covered business	-6,059	-3,556	-13,677
<b>IFRS Equity for Life and Pensions business</b>	<b>6,741</b>	<b>7,711</b>	<b>6,376</b>
IFRS Intangibles	-77	-74	-73
Difference in valuation of assets	155	185	149
Difference in technical provisions between IFRS and Life and Pensions EEV	-341	-366	-422
Other	46	43	-9
<b>SNW for Life and Pension business</b>	<b>6,524</b>	<b>7,498</b>	<b>6,021</b>

The differences between Life and Pensions EEV shareholders' adjusted net worth and the IFRS shareholders' equity include:

- *Shareholders' equity of non-covered business.* The Life and Pensions EEV shareholders' adjusted net worth only relates to the covered life business. Therefore, any shareholders' equity relating to other lines of business, including any consolidation adjustment, is deducted;
- *Intangibles.* Intangibles in relation to the covered business are not included in the Life and Pensions EEV shareholders' adjusted net worth;
- *Differences in valuation of assets.* The Group has adjusted the book value of the assets deemed not to back the in-force regulatory liabilities by the after-tax impact of unrealised gains and losses;
- *Difference in technical provisions between IFRS and Life and Pensions EEV.* The after-tax Life and Pensions EEV shareholders' adjusted net worth is based on regulatory reserves which are discounted at different valuation rates compared to those used for IFRS reporting

## 4.6 LIFE AND PENSIONS EEV ANALYSIS OF EARNINGS

The tables below set out the analysis of embedded value earnings of the Life and Pensions EEV.

**TABLE 4.6**

### **LIFE AND PENSIONS EEV ANALYSIS OF EARNINGS YEAR ENDING 31 DECEMBER**

**PLN MILLION**

	<b>Free surplus</b>	<b>Required capital</b>	<b>VIF</b>	<b>EEV</b>
Opening EEV	4,093	3,405	12,853	20,351
Value added by new business	-389	301	183	95
Expected existing business contribution (reference rate)	419	-218	694	895
Expected existing business contribution (in excess reference rate)	85	3	11	100
Transfers from VIF and required capital to free surplus	1,160	-	-1,160	-
Operating variances	452	129	-284	297
Operating assumption changes	-771	771	554	554
Other operating earnings	-	-	-7	-7
<b>EV operating earnings</b>	<b>956</b>	<b>986</b>	<b>-8</b>	<b>1,934</b>
Economic variances	198	6	-40	163
Other non-operating variance	-	-	-	-
<b>Total Embedded Value earnings</b>	<b>1,154</b>	<b>992</b>	<b>-48</b>	<b>2,098</b>
Closing adjustments	-3,120	-	-	-3,120
<b>Closing EEV</b>	<b>2,127</b>	<b>4,397</b>	<b>12,805</b>	<b>19,329</b>

The line items of the analysis of embedded value earnings are explained below. The new business value is separately discussed in section 5.

#### **4.6.1 EXPECTED EXISTING BUSINESS CONTRIBUTION**

The expected existing business contribution (reference rate) represents the unwinding of the reference rate on the opening Life and Pension EEV. However, the reference rate is not an estimate of the actual expected investment returns based on the Group's expectations. Accordingly, on a separate line, the expected investment return over and above the reference rate is included on the basis set out in section 3.2.

#### **4.6.2 OPERATING VARIANCES**

Operating variances represent the impact on the Life and Pensions EEV as a result of the difference between assumed and actual operating experience in the reporting period, including expense, demographic and persistency experience. The main drivers of the operating variances of PLN 297 million in 2010 are:

- Group conversion effect of circa PLN 59 million;
- Positive development of group business of circa PLN 150 million;
- For continued business, operating experience of circa PLN 140 million;
- Negative expense deviation of circa PLN -74 million; and
- Positive variances for the pension business of circa PLN 20 million

During 2010, about 200,000 members converted to yearly renewable term leading to about PLN 59 million contribution to the operating variance. This comprised of a post tax regulatory reserve release of circa PLN 400 million and an offsetting decrease in the value of in-force covered business of circa PLN 340 million. As noted previously, the embedded value does not include allowance for potential future conversion of schemes from whole life to yearly renewable term.

For comparison, the effect of the group business conversion in 2009 was circa PLN 300 million to the operating variance (PLN 1.4 billion pre tax reserve release and circa PLN 850 million decrease in the value of in-force business).

The process of converting schemes from whole life to yearly renewable term is correlated with increasing competition in the Polish group business market and subsequent profit margin erosion. The Group reacted to this trend by offering alternative or extended coverage to members which resulted in operating variances.

Deviations from the expected development of the group business gave a positive effect of circa PLN 150 million. This includes changes in the scope of insurance coverage, deviations in mortality and morbidity rates and individual continuations.

Other variance of PLN 140 million on the continued business is associated with positive mortality / morbidity and persistency experience development.

A negative impact of PLN -74 million is related mostly to higher expenses not directly related to products (the cost of one-off projects in 2010, the balance of income and expenses for technical and general account, in particular, contributions to the special purpose fund).

For the pension business, the operating variances of PLN 20 million are dominated by transfers of delayed or unanticipated premiums from ZUS, activations of inactive members and deviations from the estimated volumes of in-force business.

#### **4.6.3 OPERATING ASSUMPTION CHANGES**

The operating assumption changes of PLN 554 million relate mainly to changes in the future assumed maintenance expenses, and a number of assumptions relating to the group and the continued business. A breakdown of the change is as follows:

- The impact of change for the life business in the maintenance expense assumptions due to revised unit expenses was circa PLN 185 million. This is based on a new expense allocation model the Group has prepared in 2010 which better reflects the new organizational structure of the Group;



- For the group business, the combined impact of changes to future expected indexation, continuation rates and improvements in claims experience amounts to circa PLN 254 million;
- A positive change in the persistency assumptions for the continued business where the cumulative effect on the embedded value was circa PLN 92 million; and
- Total impact of other assumption changes was PLN 23 million.

#### 4.6.4 ECONOMIC VARIANCES

This item includes the impact of both investment variances and economic assumption changes. Investment variances reflect the impact of actual investment return experience in the period differing from assumed investment returns.

#### 4.6.5 OTHER NON-OPERATING VARIANCE

There were no other non-operating variances in 2010.

#### 4.6.6 CLOSING ADJUSTMENTS

Closing adjustments represent capital transfers within the PZU Group. In particular, PZU Life paid a dividend to PZU SA of PLN 3,120 million in 2010.

## 5 NEW BUSINESS VALUE RESULTS

The table below sets out an overview of the after-tax new business value. This is one of the key indicators that the Group uses to measure the profitability of its new life and pensions insurance business.

**TABLE 5.1**

### NEW BUSINESS VALUE SUMMARY

PLN MILLION

	2010			2009		
	Life	Pensions	Total	Life	Pensions	Total
New business value	81	14	95	72	7	79
Annual premium	191	140	331	192	212	404
Single premium	2,444	856	3,300	3,546	1,140	4,685
Present Value of New Business Premiums	3,527	3,588	7,115	4,617	5,000	9,616
Average annual premium multiplier <sup>(1)</sup>	5,7	19,5	11,5	5,6	18,2	12,2
New Business Margin (PVNBP basis)	2.3%	0.4%	1.3%	1.6%	0.1%	0.8%
APE <sup>(2)</sup>	435	226	661	547	326	873
New Business Margin (APE basis)	18.5%	6.3%	14.3%	13.2%	2.0%	9.0%
IRR	16.7%	10.2%	14.9%	15.6%	8.9%	13.1%

(1) Calculated by the following formula: (PVNBP- single premium)/annual premium

(2) APE = annual premium + 10% of single premium (including bancassurance)

The majority of the 2010 and 2009 new business value arises from the group business and riders for the continued business. Other products such as individual unit-linked or endowment type products are much less significant. The overall new business margin is significantly affected by the bancassurance deposit products which have low profitability but very high volumes relative to the rest of the new business. If bancassurance products are excluded then the total Life and Pensions EEV new business margin on a PVNBP basis would be 1.9% and 1.3% in 2010 and 2009, respectively.

The change in margin on the PVNBP basis from 2009 to 2010 can be broken down into the following categories.

**TABLE 5.2**

**CHANGE IN NEW BUSINESS MARGIN  
IN %**

	Life business		Pensions business		Total	
	Margin	Change	Margin	Change	Margin	Change
2009 margin	1.6%		0.1%		0.8%	
Change in Volume	1.6%	0.0%	0.1%	0.0%	0.9%	0.0%
Change in Business Mix	2.4%	0.9%	0.0%	-0.1%	1.2%	0.4%
Change in Assumptions	2.3%	-0.1%	0.0%	0.0%	1.1%	-0.1%
Other	2.3%	0.0%	0.4%	0.4%	1.3%	0.2%
2010 margin	2.3%		0.4%		1.3%	

The new business profit margin on a PVNBP basis for the life and pension business rose from 0.8% in 2009 to 1.3% in 2010.

## 6 SENSITIVITY ANALYSIS

Embedded value calculations rely upon best estimate assumptions such as interest rates, investment returns, mortality rates, lapse rates and expense assumptions.

Sensitivity testing of the embedded value outcomes for alternative assumptions is provided in the table below. The table shows the sensitivity to certain key assumptions of the embedded value and the new business value for Life and Pensions business at 31 December 2010.

Please note that sensitivities are not cumulative.

**TABLE 6.1****LIFE AND PENSIONS SENSITIVITIES AT 31 DECEMBER 2010****PLN million**

	Life and Pensions EEV		New business value	
	Value	Change	Value	Change
Base Value	19,329		95	
Sensitivity to economic assumptions				
Market interest rates -1%	20,190	862	113	18
Market interest rates +1%	18,498	-831	80	-15
Equity market values -10%	19,096	-233	96	1
Swaption implied volatility +25%	19,302	-27	94	-1
Equity implied volatility +25%	19,211	-118	90	-5
Swap yield curve as reference rate	19,556	228	105	10
Required capital – 100% EU minimum	19,626	297	102	7
Sensitivity to non-economic assumptions				
Maintenance expenses -10%	19,657	328	105	10
Acquisition expenses -10%	N/A	N/A	103	8
Lapse rates -10%	19,360	32	106	11
Assurance mortality/morbidity -5%	20,251	922	109	14
Annuitant mortality -5%	19,325	-4	95	-

A brief explanation of each of the sensitivities is given below.

*Market interest rates -1% / +1%:* When the market interest rate sensitivities are performed consequential changes in yield and values are allowed for on all assets and liabilities, with the exception of indexation assumptions on group and continued business. The sensitivity to changes in market interest rates is relatively small since investment margins are offset by adjustments to the reference rates.

*Equity market values -10%:* This sensitivity reflects the impact of an immediate reduction in the market value of equities. All other economic assumptions, including reference rates, remain unchanged. The impact is relatively small since only 30% of the assets backing Pensions business and ca. 30% of the assets backing Life shareholders' adjusted net worth include exposure to equities. No equities are held in respect of the Life group, continued and traditional participating business.

*Swaption implied volatility +25% / Equity implied volatility +25%:* The 25% is a multiplicative increase in volatilities. The swaption and equity implied volatility sensitivities only have a material impact on the TVOG in the pension business.

*Swap yield curve as reference rate:* The Group uses Polish Treasury bond rates as the reference rate, for consistency with its risk management strategy and because it believes that Polish Treasury bonds are more liquid than swaps in Poland. However, since swap rates could be considered as a potential alternative choice for the reference rate, this sensitivity has been provided to indicate the impact thereof. PZU Group assumes that the Polish swap market is liquid for durations up to 20 years. For further durations yield curve is extrapolated using flat forward rates.

*Required capital – 100% EU minimum:* In this sensitivity the FCRC was calculated assuming statutory minimum capital requirements, being 100% of the EU minimum for life business and no capital requirements for PZU PTE.

*Lapse rates -10%:* To illustrate the impact of an adverse scenario in the assumed level of lapses, lapse rates were decreased by 10% of the base assumption. The relatively small impact of the lapse sensitivity is due to a low level of lapse rates in the core business and from off-setting effects within the life portfolio.

*Assurance mortality/morbidity -5%:* To illustrate the impact of lower mortality/morbidity, it was assumed that rates decrease by 5% of the base assumptions for all business except annuity business. This sensitivity shows that the insurance portfolio of the Group is dominated by the risk business and any changes in the assumed mortality rates may heavily influence the valuation.

*Annuitant mortality -5%:* to illustrate the impact of lower mortality in annuity business, it has been assumed that rates decrease by 5% of the base assumptions for annuity business only.

## 7 IDR AND TRADITIONAL EMBEDDED VALUE

For communication purposes, an IDR has been calculated for the Group.

As described previously, the IDR is the risk discount rate which, when used within a Traditional Embedded Value approach using investment risk premiums in the projections (net of traditional cost of required capital, with no explicit allowance for the TVOG or CNHR) gives the same value as that arising from the Life and Pensions EEV approach (net of the TVOG, FCRC and CNHR).

The calculated IDR as at 31 December 2010 and at 31 December 2009 for both the in-force covered business and the new business is shown in the table below.

**TABLE 7.1**

**LIFE AND PENSIONS IDR AT 31 DECEMBER 2010 AND AT 31 DECEMBER 2009**  
%

	Life and Pensions EEV		New business value	
	2010	2009	2010	2009
Life	7.4%	7.5%	8.5%	8.5%
Pensions	7.3%	7.8%	7.9%	8.3%
Overall	7.4%	7.6%	8.3%	8.4%

The following table sets out the sensitivity to the IDR of the 31 December 2010 Life and Pensions EEV and the new business value.

**TABLE 7.2****IDR SENSITIVITIES AT 31 DECEMBER 2010****PLN million**

	Life and Pensions EEV		New business value	
	Value	Change	Value	Change
At IDR	19,329		95	
At IDR + 1%	17,942	-1,387	75	-20
At IDR – 1%	20,967	1,638	119	24

## 8 STATEMENT OF MANAGEMENT BOARDS

When compliance with the EEV Principles is stated, those principles require the management boards of PZU Life, PZU PTE and PZU SA to prepare supplementary information in accordance with the methodology contained in the EEV Principles and to disclose and explain any non-compliance with the guidance included in the EEV Principles. In preparing this supplementary information, the directors have done so in accordance with these EEV Principles and have also fully complied with all the guidance included therein.

Specifically, the management boards of PZU Life, PZU PTE and PZU SA have:

- Determined assumptions on a realistic basis, having regard to past, current and expected future experience and to relevant external data, and then applied them consistently;
- Made estimates that are reasonable and consistent; and
- Provided additional disclosures when compliance with the specific requirements of the EEV Principles is sufficient to enable users to understand the impact of particular transactions, other events and conditions and the Group's financial position and financial performance.

## 9 TOWERS WATSON OPINION

Towers Watson has reviewed the methodology and assumptions used to determine the 2010 embedded value results of PZU Group and also reviewed the results of the calculations. The review covered the embedded value as at 31 December 2010, the value of 2010 new business, the analysis of movement in embedded value over 2010 and the sensitivities on the embedded value and new business value, determined by PZU Group according to the European Embedded Value ("EEV") Principles as published by the CFO Forum on 5 May 2004 and 31 October 2005.

Towers Watson has concluded that the methodology and assumptions used by PZU Group comply with the requirements of the EEV Principles and Guidance, and in particular that:

- The methodology makes allowance for the aggregate risks in the covered business through the methodology set out in sections 2 and 3 of this disclosure document. This includes a market-consistent allowance for the time value of financial options and guarantees, allowance for non-hedgeable risk using a cost of capital methodology and a deduction for the frictional cost of required capital;
- The operating assumptions have been set with appropriate regard to past, current and expected future experience;
- With the exception of inflation, which is set according to PZU Group's long-term macro-economic view, the economic assumptions used are internally consistent and consistent with observable

market data; and where market data is not available the economic assumptions have been set in an appropriate manner; and

- For the participating business, the assumed future bonus rates, asset allocation, allocation of profit sharing between shareholders and policyholders, and other management actions, are consistent with other assumptions used in the projections, and with local market practice.

We note the following issues, which are described in more detail in this disclosure document:

- Due to the complex nature of the group business written and the lack of per-policy data available, various simplifications have been employed by PZU Group in the modelling of group business and in the determination of key assumptions. Hence, the embedded value calculations for the group business require more assumptions and simplifications than is normally the case for individual life insurance business;
- The value of the group business is based on management's expectations about pricing, renewal rates, claims development and indexation, which affect future premium renewals and profitability. The value is therefore dependent on management's ability to manage the business in line with these expectations;
- In the past, PZU Life has converted substantial proportions of its group whole life business into group yearly renewal term business. In the valuation, only the effect of past conversions has been assessed. Furthermore, PZU Life has set its assumptions for the whole life group business based on retention of the current premium rate level, portfolio structure and scope of coverage. In the past, conversions have generally led to a positive impact on the embedded value; and
- Pension business: The EEV calculations for PZU PTE have been performed on the basis of the continuation of the legal situation as at 31 December 2010. In particular, possible amendments to the Polish pension law in 2011 and the impact of any further change to the Polish pension system have not been allowed for.

Towers Watson has also performed limited high-level checks on the results of the calculations and has confirmed that any issues discovered do not have a material impact on the disclosed embedded value, new business value, analysis of movement and sensitivities. We relied on IFRS numbers, but reviewed the Group EEV for reasonableness. Towers Watson has not, however, performed detailed checks on the models and processes involved.

In arriving at these conclusions, Towers Watson has relied on data and information provided by PZU Group and its subsidiaries. This opinion is made solely to PZU Group in accordance with the terms of Towers Watson's engagement letter. To the fullest extent permitted by applicable law, Towers Watson does not accept or assume any responsibility, duty of care or liability to anyone other than PZU Group for or in connection with its review work, the opinions it has formed, or for any statement set forth in this opinion.