

# **Risk-free interest rate term structures**

## **Report on the**

### **Calculation of the UFR for 2021**

#### **Executive summary**

EIOPA has calculated ultimate forward rate (UFR) for 2021 in accordance with the methodology to derive the UFR. For the euro, the calculated UFR for 2020 is 3.50%. As the current UFR for the euro is 3.75% and the annual change of the UFR is according to the methodology limited to 15 basis points, the applicable UFR in 2021 is 3.60%. That UFR is for the first time applicable for the calculation of the risk-free interest rates of 1 January 2021<sup>1</sup>.

#### **1. Expected real rate**

The UFR is the sum of an expected real rate and an expected inflation rate. The expected real rate is the same for all currencies. It is calculated as a simple average of the past real rates since 1961. For the calculation of the expected real rate for 2021, the observed real rate of 2019, which is - 1.32%, newly enters the calculation. The resulting expected real rate is 1.50%. Annex 1 sets out intermediate results of the calculation.

#### **2. Expected inflation rate**

The expected inflation rate is currency-specific. It is based on the inflation target of central banks and can take the values 1%, 2%, 3% or 4%.

The expected inflation rate remains unchanged for all currencies. The following table sets out the expected inflation rate per currency. Annexes 2 and 3 set out

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<sup>1</sup> Please note that the EC Delegated act published by the Commission on the 8th of March 2019 introduced additional provisions concerning EIOPA's work on the risk-free technical information, including that the technical information shall be modified by EIOPA at the request of the European Commission.  
[http://ec.europa.eu/finance/docs/level-2-measures/solvency2-delegated-regulation-2019-1900\\_en.pdf](http://ec.europa.eu/finance/docs/level-2-measures/solvency2-delegated-regulation-2019-1900_en.pdf)

the underlying inflation targets and the determination of the expected inflation rate for currencies without inflation target.

	<b>Currency</b>	<b>Expected inflation rate</b>
EUR	Euro	2%
CZK	Czech koruna	2%
GBP	Pound sterling	2%
HRK	Kuna	2%
HUF	Forint	3%
PLN	Zloty	2%
RON	Leu	2%
SEK	Krona	2%
CHF	Swiss franc	1%
ISK	Króna	2%
NOK	Norwegian krone	2%
AUD	Australian dollar	2%
BRL	Real	4%
CAD	Canadian dollar	2%
CLP	Chilean peso	3%
CNY	Renminbi-yuan	3%
COP	Colombian peso	3%
HKD	Hong Kong dollar	2%
INR	Indian rupee	4%
JPY	Yen	2%
KRW	South Korean won	2%
MYR	Ringgit	2%
MXN	Mexican peso	3%
NZD	New Zealand dollar	2%
RUB	Russian rouble	4%
SGD	Singapore dollar	2%
THB	Baht	2%
TRY	Turkish lira	4%
TWD	New Taiwan dollar	2%
USD	US dollar	2%
ZAR	Rand	4%

### 3. Ultimate forward rate

The following table sets out the calculated UFRs and the UFRs applicable in 2021.

Currency Code	Currency	Calculated UFR	UFR applicable in 2021
EUR	Euro	3.50%	3.60%
CZK	Czech koruna	3.50%	3.60%
GBP	Pound Sterling	3.50%	3.60%
HRK	Kuna	3.50%	3.60%
HUF	Forint	4.50%	4.50%
PLN	Zloty	3.50%	3.60%
RON	Leu	3.50%	3.60%
SEK	Krona	3.50%	3.60%
CHF	Swiss franc	2.50%	2.60%
ISK	Króna	3.50%	3.60%
NOK	Norwegian krone	3.50%	3.60%
AUD	Australian dollar	3.50%	3.60%
BRL	Real	5.50%	5.50%
CAD	Canadian dollar	3.50%	3.60%
CLP	Chilean peso	4.50%	4.50%
CNY	Renminbi-yuan	4.50%	4.50%
COP	Colombian peso	4.50%	4.50%
HKD	Hong Kong dollar	3.50%	3.60%
INR	Indian rupee	5.50%	5.50%
JPY	Yen	3.50%	3.50%
KRW	South Korean won	3.50%	3.60%
MYR	Ringgit	3.50%	3.60%
MXN	Mexican peso	4.50%	4.60%
NZD	New Zealand dollar	3.50%	3.60%
RUB	Russian rouble	5.50%	4.80%
SGD	Singapore dollar	3.50%	3.60%
THB	Baht	3.50%	3.60%
TRY	Turkish lira	5.50%	5.50%
TWD	New Taiwan dollar	3.50%	3.60%
USD	US dollar	3.50%	3.60%
ZAR	Rand	5.50%	5.50%

### Annex 1 – Calculation of the expected real rate

The following table sets out the time series of real rates used for the calculation of the expected real rate. Real rates in the table are rounded to two decimal digits for presentational reasons.

Year	Real rates <sup>2</sup>
1961	1.58%
1962	0.09%
1963	0.01%
1964	0.46%
1965	1.09%
1966	1.64%
1967	1.89%
1968	1.82%
1969	2.08%
1970	2.50%
1971	-0.23%
1972	-0.91%
1973	0.81%
1974	-1.11%
1975	-4.82%
1976	-0.94%
1977	-1.66%
1978	0.78%
1979	1.45%
1980	1.05%
1981	3.71%
1982	3.34%
1983	3.48%
1984	4.35%
1985	4.48%
1986	5.83%
1987	5.01%
1988	4.74%
1989	5.66%
1990	5.61%
1991	4.87%
1992	5.53%
1993	3.90%
1994	3.11%
1995	3.56%
1996	2.25%
1997	2.73%
1998	3.12%
1999	2.23%
2000	2.74%
2001	1.77%

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<sup>2</sup> For the CPI in Germany, DESTATIS changed the methodology for the calculation of the CPI and retroactively updated the figures from 2015 onwards. The new figures are used in the calculation.

2002	1.21%
2003	0.49%
2004	0.47%
2005	0.57%
2006	1.61%
2007	2.58%
2008	1.18%
2009	0.58%
2010	-0.94%
2011	-1.61%
2012	-1.79%
2013	-1.28%
2014	-0.60%
2015	-0.21%
2016	-0.74%
2017	-1.69%
2018	-1.65%
2019	<b>-1.32%</b>

Expected real rate before rounding:

= Average of real rates from 1961 to 2019

= 1.46537%

Expected real rate after rounding:

= **1.50%**

## Annex 2 – Inflation targets

The following table sets out the inflation targets. The information was derived from the specified sources on 28 January 2020.

	Currency	Inflation target	Source
<b>EUR</b>	Euro	Below, but close to 2%	<a href="https://www.ecb.europa.eu/mopo/html/index.en.html">https://www.ecb.europa.eu/mopo/html/index.en.html</a>
<b>CZK</b>	Czech koruna	2% ± 100bps	<a href="https://www.cnb.cz/en/monetary-policy/strategic-documents/monetary-strategy-and-inflation-targets/index.html">https://www.cnb.cz/en/monetary-policy/strategic-documents/monetary-strategy-and-inflation-targets/index.html</a> <a href="https://www.cnb.cz/export/sites/cnb/en/monetary-policy/.galleries/strategic_documents/inflacni_cil_cnb_en_2010.pdf">https://www.cnb.cz/export/sites/cnb/en/monetary-policy/.galleries/strategic_documents/inflacni_cil_cnb_en_2010.pdf</a>
<b>GBP</b>	Pound sterling	2%	<a href="https://www.bankofengland.co.uk/monetary-policy">https://www.bankofengland.co.uk/monetary-policy</a>
<b>HRK</b>	Kuna	<b>No IT</b>	<a href="https://www.hnb.hr/en/core-functions/monetary-policy/monetary-policy-framework">https://www.hnb.hr/en/core-functions/monetary-policy/monetary-policy-framework</a>
<b>HUF</b>	Forint	3% ± 100bps	<a href="http://www.mnb.hu/en/monetary-policy/monetary-policy-framework/inflation-targeting">http://www.mnb.hu/en/monetary-policy/monetary-policy-framework/inflation-targeting</a>
<b>PLN</b>	Zloty	2.5% ± 100bps	<a href="http://www.nbp.pl/homen.aspx?f=/en/onbp/informacje/polityka_pieniezna.html">http://www.nbp.pl/homen.aspx?f=/en/onbp/informacje/polityka_pieniezna.html</a>
<b>RON</b>	Leu	2.5% ± 100bps	<a href="http://bnr.ro/Inflation-Targets-3241.aspx">http://bnr.ro/Inflation-Targets-3241.aspx</a>
<b>SEK</b>	Krona	around 2%	<a href="https://www.riksbank.se/en-gb/monetary-policy/the-inflation-target/">https://www.riksbank.se/en-gb/monetary-policy/the-inflation-target/</a>
<b>CHF</b>	Swiss franc	Less than 2 %	<a href="https://www.snb.ch/en/ifor/public/qas/id/qas_gp_strat#t6">https://www.snb.ch/en/ifor/public/qas/id/qas_gp_strat#t6</a>
<b>ISK</b>	Króna	2.50% ± 150bps	<a href="http://www.cb.is/monetary-policy/inflation-target/">http://www.cb.is/monetary-policy/inflation-target/</a> , in addition also: <a href="http://www.cb.is/library/Skraarsafn---EN/Monetary-Policy-Committee/Declaration%20inflation.pdf">http://www.cb.is/library/Skraarsafn---EN/Monetary-Policy-Committee/Declaration%20inflation.pdf</a>
<b>NOK</b>	Norwegian krone	2%	<a href="https://www.norges-bank.no/en/topics/Statistics/Inflation/">https://www.norges-bank.no/en/topics/Statistics/Inflation/</a>

<b>AUD</b>	Australian dollar	2% - 3%	<a href="http://www.rba.gov.au/inflation/inflation-target.html">http://www.rba.gov.au/inflation/inflation-target.html</a>
<b>BRL</b>	Real	4.0% ± 150bps	<a href="https://www.bcb.gov.br/en">https://www.bcb.gov.br/en</a> with further links to: <a href="http://www.bcb.gov.br/pec/metast/InflationTargetingTable.pdf">http://www.bcb.gov.br/pec/metast/InflationTargetingTable.pdf</a> and <a href="https://www.bcb.gov.br/en/monetarypolicy/historicalpath">https://www.bcb.gov.br/en/monetarypolicy/historicalpath</a>
<b>CAD</b>	Canadian dollar	2% ± 100bps	<a href="http://www.bankofcanada.ca/rates/indicators/key-variables/inflation-control-target/">http://www.bankofcanada.ca/rates/indicators/key-variables/inflation-control-target/</a>
<b>CLP</b>	Chilean peso	3% ± 100bps	<a href="https://www.bcentral.cl/en/web/banco-central/areas/monetary-politics">https://www.bcentral.cl/en/web/banco-central/areas/monetary-politics</a>
<b>CNY</b>	Renminbi-yuan	3%	<a href="http://www.china.org.cn/china/2018-02/09/content_50466787.htm">http://www.china.org.cn/china/2018-02/09/content_50466787.htm</a> <a href="http://www.chinadaily.com.cn/a/201801/11/WS5a569f2ca3102e5b173740d3.html">http://www.chinadaily.com.cn/a/201801/11/WS5a569f2ca3102e5b173740d3.html</a> <a href="http://www.centralbanknews.info/p/inflation-targets.html">http://www.centralbanknews.info/p/inflation-targets.html</a>
<b>COP</b>	Colombian peso	3% ± 100bps	<a href="http://banrep.gov.co/en/monetary-policy/monetary-policy-inflation-targeting-strategy-colombia">http://banrep.gov.co/en/monetary-policy/monetary-policy-inflation-targeting-strategy-colombia</a>
<b>HKD</b>	Hong Kong dollar	<b>No IT</b>	<a href="https://www.hkma.gov.hk/eng">https://www.hkma.gov.hk/eng</a>
<b>INR</b>	Indian rupee	4% ± 200bps	<a href="https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=48916">https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=48916</a>
<b>JPY</b>	Yen	2%	<a href="https://www.boj.or.jp/en/mopo/outline/qqe.htm/#p01">https://www.boj.or.jp/en/mopo/outline/qqe.htm/#p01</a>
<b>KRW</b>	South Korean won	2%	<a href="https://www.bok.or.kr/eng/main/contents.do?menuNo=400015">https://www.bok.or.kr/eng/main/contents.do?menuNo=400015</a>
<b>MYR</b>	Ringgit	<b>No IT</b>	
<b>MXN</b>	Mexican peso	3% ± 100bps	<a href="http://www.banxico.org.mx/politica-monetaria-e-inflacion/material-de-referencia/basico/preguntas-frecuentes-de-politica-monetaria-e-infla/monetary-policy-and-inflation.html">http://www.banxico.org.mx/politica-monetaria-e-inflacion/material-de-referencia/basico/preguntas-frecuentes-de-politica-monetaria-e-infla/monetary-policy-and-inflation.html</a> in addition also: <a href="https://www.banxico.org.mx/publications-and-press/monetary-policy-programs/%7B8712A1DE-8FDC-D76C-2754-C8B95D8646DB%7D.pdf">https://www.banxico.org.mx/publications-and-press/monetary-policy-programs/%7B8712A1DE-8FDC-D76C-2754-C8B95D8646DB%7D.pdf</a> <a href="http://www.centralbanknews.info/p/inflation-targets.html">http://www.centralbanknews.info/p/inflation-targets.html</a>
<b>NZD</b>	New	2% ± 100bps	<a href="https://www.rbnz.govt.nz/monetary-policy">https://www.rbnz.govt.nz/monetary-policy</a>

	Zealand dollar		
<b>RUB</b>	Russian rouble	4%	<a href="http://www.cbr.ru/eng/">http://www.cbr.ru/eng/</a>
<b>SGD</b>	Singapore dollar	<b>No IT</b>	<a href="https://www.mas.gov.sg/monetary-policy/Singapores-Monetary-Policy-Framework">https://www.mas.gov.sg/monetary-policy/Singapores-Monetary-Policy-Framework</a> <a href="https://www.mas.gov.sg/-/media/MAS/Monetary-Policy-and-Economics/Monetary-Policy/MP-Framework/Singapores-Exchange-Ratebased-Monetary-Policy.pdf">https://www.mas.gov.sg/-/media/MAS/Monetary-Policy-and-Economics/Monetary-Policy/MP-Framework/Singapores-Exchange-Ratebased-Monetary-Policy.pdf</a>
<b>THB</b>	Baht	2.50% ± 150bps	<a href="https://www.bot.or.th/English/MonetaryPolicy/MonetPolicyKnowledge/Pages/Target.aspx">https://www.bot.or.th/English/MonetaryPolicy/MonetPolicyKnowledge/Pages/Target.aspx</a>
<b>TRY</b>	Turkish lira	5% ± 200bps	<a href="http://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Core+Functions/Monetary+Policy/PRICE+STABILITY+AND+INFLATION/Inflation+Targets">http://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Core+Functions/Monetary+Policy/PRICE+STABILITY+AND+INFLATION/Inflation+Targets</a>
<b>TWD</b>	New Taiwan dollar	<b>No IT</b>	
<b>USD</b>	US dollar	2%	<a href="https://www.federalreserve.gov/monetarypolicy/monetary-policy-what-are-its-goals-how-does-it-work.htm">https://www.federalreserve.gov/monetarypolicy/monetary-policy-what-are-its-goals-how-does-it-work.htm</a>
<b>ZAR</b>	Rand	3%-6%	<a href="https://www.resbank.co.za/MonetaryPolicy/DecisionMaking/Pages/InflationMeasures.aspx">https://www.resbank.co.za/MonetaryPolicy/DecisionMaking/Pages/InflationMeasures.aspx</a>



### **Annex 3 – Derivation of the expected real rate for currencies without inflation target**

For currencies without inflation target the expected inflation rate is derived from the past inflation rates and their projection to the future. The following table sets out for the affected currencies the average inflation over the last 10 years and the projected inflation rate in 2053 (in 35 years) according to an ARMA model.

<b>Currency</b>	<b>Average inflation rate over the last 10 years</b>	<b>Projection</b>
Croatian kuna	1.1%	2.2%
Malaysian ringgit	2.2%	2.4%
Hong Kong dollar	3.2%	2.6%
New Taiwan dollar	1.0%	1.6%
Singapore dollar	1.7%	2.4%

According to the UFR methodology, the expected inflation rate for currencies without inflation target is 2%, unless both the 10-year average and the projection clearly indicate that the inflation is expected to be at least one percentage point different from 2%. All currencies therefore fall in the 2% bucket.