

Ukraine fixed income

Valuating the debt operation's value recovery instrument

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Summary

We estimate the NPV of Ukraine's GDP warrants at 92% of their total par value.

This suggests the values of Ukrainian Eurobonds (assuming a 10% discount rate), which will be exchanged for new longer bonds and the warrants in an 80/20 proportion is:

- **91.0-93.2 cents per dollar for those initially maturing in Dec. 2015- Apr. 2023;**
- **95.1-96.6 cents per dollar for the paper initially maturing in Sept. and Oct. 2015.**

Our VRI (GDP warrants) value estimate for Ukraine assumes:

- A 10% discount rate for NPV calculations;
- The total par value of the VRI of USD 3.6 bln, or the maximum expected haircut on Eurobonds;
- An average growth rate for Ukrainian real GDP of 3.6% for 2016-2038 (based on the IMF's growth forecasts for 2016-2019 and the assumption of 3.5% CAGR for 2021-2038);
- An average local inflation rate of 6.0% (assuming 5.5% growth p.a. for 2021-2038);
- An average devaluation of the local currency by 2.0% p.a.

We conclude that the total payments under the VRI will be between USD 13 bln and USD 20 bln, (or less than 0.3% of Ukraine's total GDP for the payment years), which looks to be an affordable amount for the country.

To get our VRI estimate, we:

- Modeled the sensitivity of Ukraine's future VRI payments, under the rules described in Ukraine's Eurobond exchange memorandum, to three future parameters: growth of real GDP, UAH inflation and changes in the UAH/USD exchange rate.
- In order to avoid the mistake of modeling improperly the relationship between these three indicators, we ran our model by applying the real historic data of the countries whose path Ukraine is prescribed to follow in the mid- to long-term. Those are neighboring CEE countries.
- After deriving the NPV of the VRI as a function of the three parameters, we ran a single-factor regression to find a statistical relationship between the NPV and the key payment-defining factor, which appeared to be the growth of dollar-denominated GDP. Then by applying the 7.0% CAGR assumption for Ukraine's future growth in dollar GDP, we conclude that the intrinsic value of Ukraine's VRI is close to 86%-97% of its par.
- We note that our estimate of the VRI value is highly sensitive to changes in the assumption for Ukraine's dollar GDP growth.

For estimating the bottom value of Ukraine's GDP warrants, we also ran a simple model that accounts for some variability in just one parameter, real GDP. This approach yields a fair value of the VRI at about 55%-67% (or 61%, on average), at an assumed average 3.6% CAGR of real GDP in 2016-2038. This approach underestimates the payments, in our view, as it ignores fluctuation of other parameters that usually magnify the total effect on payments in the robust years.

Valuation summary

Assumed \$-GDP CAGR for 2016-2038	Assumed real GDP CAGR for 2016-2038	NPV of VRI as % of par value*	
		Simple modeling**	Advanced modeling
6.7%	3.6%	55 - 67%	49% - 58%
7.0%	3.6%	55 - 67%	86% - 97%
7.3%	3.6%	55 - 67%	124% - 136%

Ukraine GDP warrants: basics

As part of Eurobond restructuring, the Ukrainian government is offering a value recovery instrument (VRI), which is GDP warrants that might pay a certain amount of Ukraine's nominal GDP between 2021 and 2040.

Payment year (t):

The payments under warrants will be made, if the below conditions work, on May 31 of each year (t) = 2021 ... 2040.

Necessary conditions for payment in a year (t), 2021-2040:

- Dollar GDP in the reference year (t-2) exceeds USD 125.4 bln;
- Real GDP growth in the year (t-2) will exceed 3.0%.

Payment amount:

If the above conditions work, the total payment in a year (t) will be roughly 15% of the part of nominal GDP in (t-2) that corresponds to real growth between 3% and 4%, and 40% of the part of nominal GDP that corresponds to real growth in excess of 4%. The exact formula is following:

- $\text{Nominal GDP}_{(t-3)} \times [1 + \text{Deflator}_{(t-2)}] \times [\text{Real Growth}_{(t-2)} - 3\%] \times 0.15$ - if Real Growth $_{(t-2)}$ is below 4.0%
- $\text{Nominal GDP}_{(t-3)} \times [1 + \text{Deflator}_{(t-2)}] \times \{0.15 \times 1\% + 0.4 \times [\text{Real Growth}_{(t-2)} - 4\%]\}$ - if Real Growth $_{(t-2)}$ is above 4.0%.

Currency denomination:

- Nominal GDP, as well as payment amounts in each reference year (t-2), is calculated in the local currency (UAH).
- Payments for any payment year (t) is made in U.S. dollars.
- The applied exchange rate is the average official rate for March-April of each year (t).
- This implies that payments under the VRI, in USD terms, will decrease with hryvnia devaluation, unlike payments for Ukraine's other USD-denominated debt.

Payment cap:

- There is no cap for total payments under the warrants for 2021 – 2040.
- At the same time, annual payments are capped at 1% of nominal GDP for 2019-2023 (payable in 2021-2025).

Protection:

- Default on any payments under the VRI will trigger a cross default on Ukraine's new Eurobonds.

Total amount of the VRI to be issued

- At this stage, MinFin has not clarified the exact amount of GDP warrants that will be issued;
- Hereafter, we assume that the total nominal value of all warrants will be USD 3.6 bln – the maximum amount of debt that Eurobond holders can write off during the restructuring process.

Call/put:

- Warrants have no call options, but the Ukrainian government reserved the right to purchase them on the open market;
- Put options emerge in the event of default under Ukrainian sovereign obligations.

Sources for the VRI-determining data:

To calculate the UAH payments under GDP warrants, it's enough to have the following info for the reference year (t-2), to be taken from the IMF's World Economic Outlook database:

- Nominal GDP in UAH;
- Real GDP growth,
- GDP deflator,
- Annual average UAH/USD rate.

On top of that, the following data will be taken from Ukraine's central bank to convert the UAH-denominated payment amount into USD:

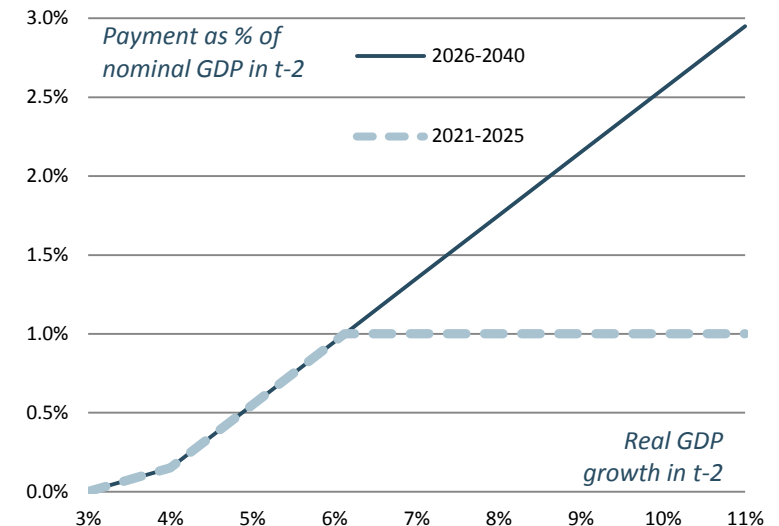
- Average official UAH/USD rate for March-April of the payment year (t).

Ukraine warrants: payments unlimited, unlike for Greece and Argentina

The key feature of Ukraine's GDP warrant is **the absence of any cap on total payment**, unlike the GDP-linked securities issued by Greece and Argentina:

- In Argentina, the total amount that can be payable under warrants cannot exceed 48% of the paper's par value.
- In Greece, the annual payment under warrants is limited to 1% of its nominal GDP for 2015-2023, and then this limit decreases gradually to zero till the year 2044. The total payment is thus limited to about 0.63% of aggregate Greek GDP for 2014-2043. On top of that, the Greek GDP-linked paper has a call option that allows the government to control/limit total payments in strong years.
- In the case of Ukraine:
 - Only two "grace periods" are provided: 2016-2020 when no payments emerge, and 2021-2025, when payments are limited to 1% of the reference year's GDP;
 - Perhaps the only thing that Ukraine can control is the dollar payments – recall, the payment is calculated as the UAH payment amount in the reference year (t-2) divided by the average UAH/USD rate in March-April of the payment year (t). This gives Ukraine the chance to reduce total payments by manipulating the official exchange rate for a certain short period.

Ukraine warrant payment as % of reference year's GDP



Value of Ukrainian warrants: view of MinFin vs. Templeton

The idea behind the issuance of Ukraine's GDP warrants (VRI) emerged in tough talks between Ukraine's MinFin and an ad hoc creditors committee led by Franklin Templeton.

It was Templeton manager Michael Hasenstab who insisted on GDP warrants in exchange for a 20% haircut on Ukraine's Eurobonds, according to Vitaliy Lisovenko, the Ukrainian government's envoy for debt restructuring. In talks with us, Lisovenko stressed that providing any haircut on debt is beyond Templeton's policy. However, an exchange of the haircut into the VRI was a compromise that was based on different visions of Ukraine's future growth that was assumed by MinFin and Hasenstab. So, the VRI is in fact Franklin Templeton's bet that the Ukrainian government's outlook for economic growth is too gloomy. Below we list some arguments provided by the two negotiating parties, as told by Lisovenko:

MinFin arguments: There won't be huge payments under the VRI

Ukraine's economy is in a deep depression, caused by the Russian military invasion and the loss of its key industrial region, the Donbas. There will be no fast solution for the Donbas conflict and the economy won't be recovering fast.

Thus, it's very unlikely that Ukraine's 2019 GDP will reach USD 125.4 bln – the level that triggers any payments under the VRI. This level assumes that Ukraine's economy should grow 47% in the next four years – such growth looks too fantastic. Therefore, VRI payments will be delayed significantly, which will reduce their NPV.

In ideal conditions, in which the Donbas war is resolved quickly and all reforms go smoothly to stimulate fast growth, Ukraine has a chance to grow very fast in 2017-2018 with no VRI payments, and then in 2019-2023, when VRI payments are limited to 1% of GDP. Afterwards, Ukraine's economy won't grow above 3%, so total VRI payments will be limited.

"Templeton"* arguments: VRI is worth the haircut amount

There is a high likelihood that the Donbas conflict will be resolved soon. If so, international financing will flow into Ukraine to invest in rebuilding Donbas and to stimulate a fast recovery.

With the necessary reforms implemented, though with some delay, Ukraine's investment climate will improve and the country will enjoy a fast economic growth in the coming decades. That's why it's worth agreeing on exchanging the haircut for the VRI.

Never before has Templeton allowed for any debt cut, and it remains committed to this policy this time as well. In exchange of the haircut, it would receive something comparable, in NPV terms.

Our position: Both positions look grounded

Our research suggests both positions have merit. Both MinFin and Templeton were interested in stating the haircut/VRI was their victory. MinFin had more incentives to declare itself the winner – as it had to persuade Ukraine's populist parliament to vote in favor of the VRI issue.

By targeting the 20% haircut (as insisted by the IMF), MinFin has sacrificed other important parameters of the debt operation: the maturity extension (which appeared to be smaller than expected) and the coupon rate on new bonds (which increased, contrary to expectations). Following this logic, we conclude that GDP warrants could be another concession from MinFin.

We believe the recovery of Ukraine's economy won't be fast enough to benefit from grace periods for VRI payments in 2016-2018 and 2019-2023. The reforms are stalling, and so will reform-driven improvement of the investment climate and economic growth.

It's not a problem for Ukraine to reach USD 125.4 bln in dollar GDP already in 2019, even at a slow pace of real GDP growth. The key growth drivers, as usual, will be high inflation and a relatively sticky UAH/USD rate (based on Ukraine's historic performance, as well as IMF forecasts till 2020).

As the experience of CEE countries suggests, reform-driven economic growth is inevitable and it stretches over time. Ukraine's economic potential (in the event of reforms, which will be implemented due to pressure from the West) will be uncovered in the long term, enabling investors to benefit from the VRI cash flows.

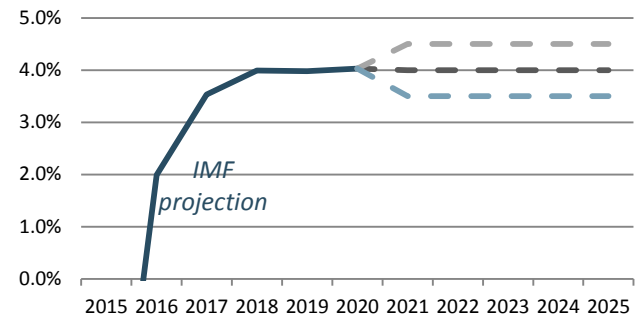
Evaluating the VRI

“Simple cases”: model specification

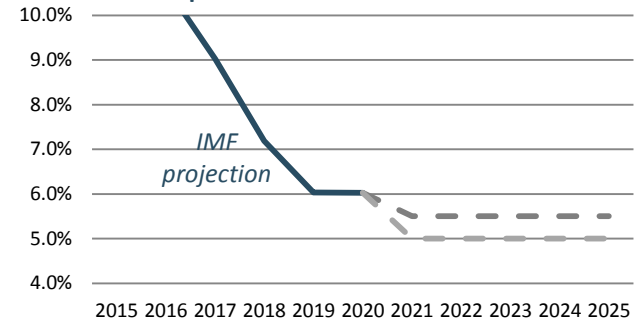
To forecast the payment flow from Ukraine’s VRI, only three parameters need to be modeled:

- **Real GDP growth:** the IMF forecasts 2.0% growth in 2016, 3.5% in 2017 and 4.0% in 2018-2020 - we take these numbers for granted. For the following years, we model 3.5% to 4.5% growth as most likely range. Our base-case scenario is 3.5% growth - we do not expect the average growth will lag this number, given that Ukraine showed more in the past, with no reforms, and the nation has no other way but to reform itself and benefit from “reforms+investments”-driven growth.
- **GDP deflator:** the IMF forecasts 10.6% in 2016, 9.0% in 2017, 7.2% in 2018 and 6.0% in 2019-2020. The NBU reportedly targets a 5% inflation rate for the mid-term. We believe that 5.5% growth in the mid- to long-term is a good estimate.
- **UAH/USD exchange rate:** that’s perhaps the most controversial estimate. In theory, if Ukraine’s exchange rate will be determined by the market (which was never the case before), the hryvnia should follow a purchasing power parity (PPP) rule vs. the dollar, or an interest rate parity rule. The IMF is forecasting the hryvnia to devalue just 7.2% vs. the dollar in 2016-2020, while total Ukraine’s inflation for this period is forecasted at 45.4% - that’s a clear deviation from the PPP rule. Based on this IMF estimate, we forecast that the hryvnia will continue to be a bit stronger vs. the dollar in PPP terms in the future as well (i.e. the UAH/USD rate will move closer to the interest rate parity rule). That said, with forecasted inflation of 5.5% p.a. in Ukraine and 2.5% p.a. in U.S. in 2021+, we forecast the hryvnia will weaken 2.4% p.a. vs. the dollar (vs. 3.3%, as implied by the PPP rule).

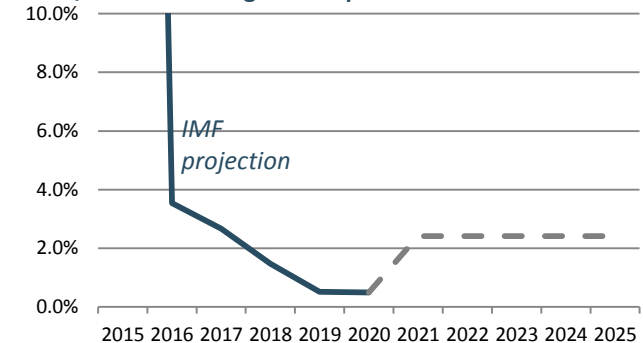
Real GDP growth assumptions



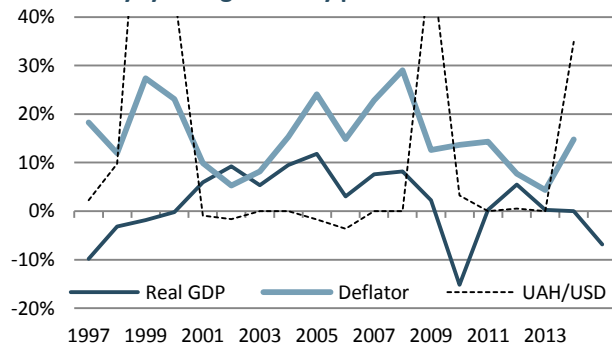
Deflator assumptions



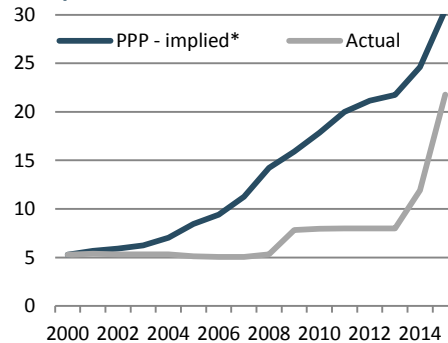
UAH/USD rate change assumption



Historical yoy changes in key parameters



UAH/USD rate



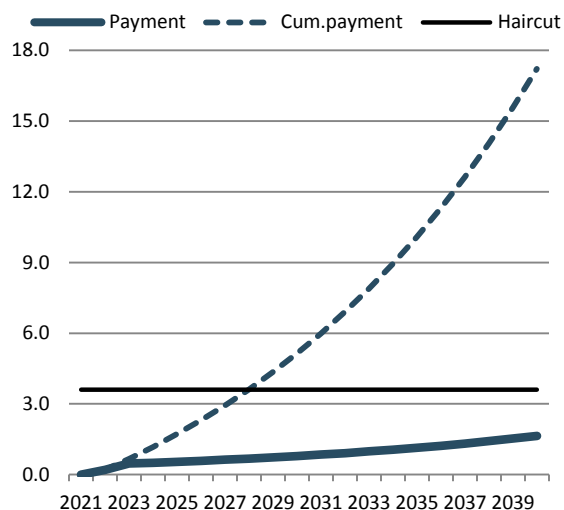
“Simple cases”: constant growth assumption looks too conservative

What we are hearing repeatedly from Ukrainian government officials is that at average real GDP growth of 3% to 4%, the total payment under warrants won't exceed USD 10 mln.

Indeed, if we model constant real GDP growth, we will return to miserable payment volumes under the warrants. The net present value of all payments will only be close to the amount of the haircut (or the nominal value of the VRI) at 4.5% real growth of the Ukrainian economy in the coming 20 years - something that does not look real.

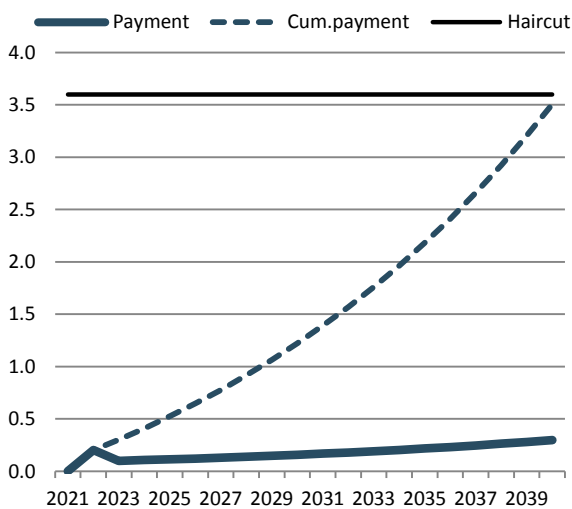
At the same time, constant growth in real GDP is something very unusual for any economy. Therefore, such constant growth scenarios don't look realistic. By its design, VRI yields higher payments if growth is more volatile.

Payments under the VRI, assuming constant real GDP growth in 2021-2038, USD bln:
4.5% growth



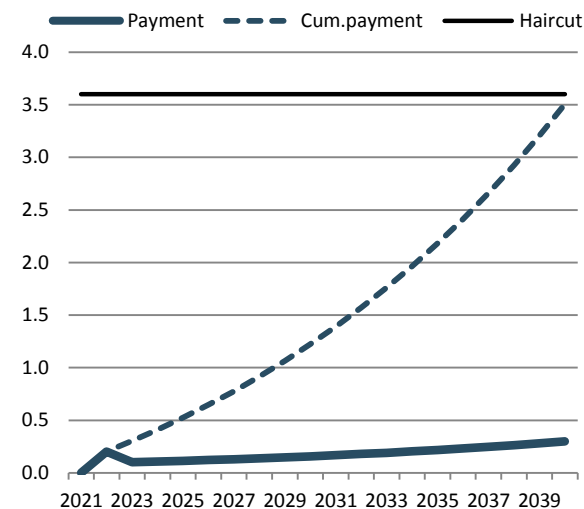
Total payments: **USD 17.2 bln**
NPV of payments*: **USD 3.6 bln**
IRR of the haircut: **9.9%**
Fair value of the VRI*: **99%**

4.0% growth



Total payments: **USD 7.1 bln**
NPV of payments*: **USD 1.5 bln**
IRR of the haircut: **4.1%**
Fair value of the VRI*: **43%**

3.5% growth



Total payments: **USD 3.5 bln**
NPV of payments*: **USD 0.8 bln**
IRR of the haircut: **-0.2%**
Fair value of the VRI*: **22%**

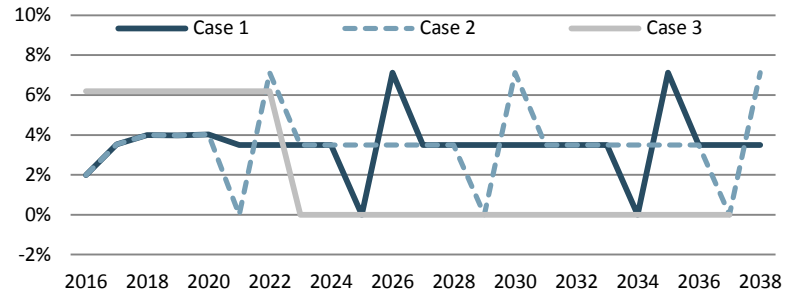
“Simple cases” with some volatility

Below we offer three scenarios that are a bit closer to reality:

1. 3.5% CAGR in real GDP in 2021-2038, with **two** simple cycles (when GDP growth is zero in one year and then catches up to 7.1% in the next year);
2. 3.5% CAGR in real GDP in 2021-2038, with **three** simple cycles;
3. Fast growth in 2017-2023 (6.5% p.a.) and below 3% growth afterwards (this is what MinFin believes might happen in case of de-escalation in Donbas and fast reforms) – we are not believers in this scenario.

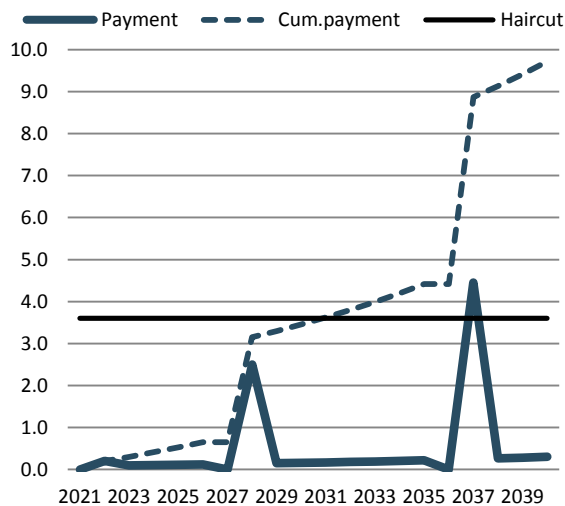
As can be observed, a deviation from the average growth in some periods increases the net present value of the VRI by several times, as compared to the constant growth case, even though the average growth is the same.

Real GDP growth scenarios



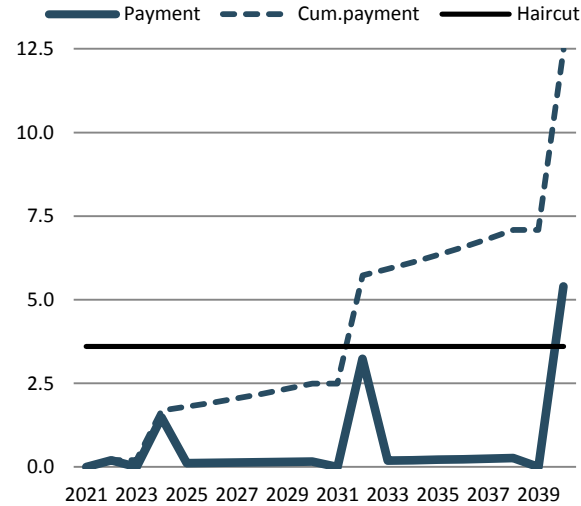
Payments under the VRI, assuming some divergence from constant growth, USD bln:

Case 1 (constant growth with two cycles)



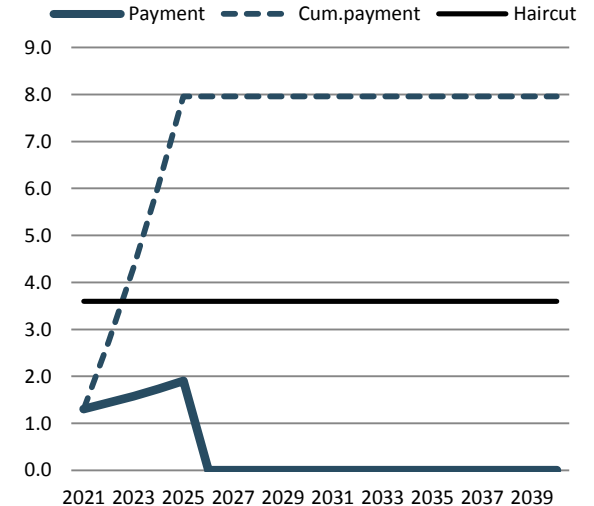
Total payments: **USD 9.7 bln**
 NPV of payments*: **USD 2.0 bln**
 IRR of the haircut: **6.0%**
 Fair value of the VRI*: **55%**

Case 2 (constant growth with three cycles)



Total payments: **USD 12.5 bln**
 NPV of payments*: **USD 2.4 bln**
 IRR of the haircut: **7.3%**
 Fair value of the VRI*: **67%**

Case 3 (very fast recovery)



Total payments: **USD 8.0 bln**
 NPV of payments*: **USD 3.9 bln**
 IRR of the haircut: **11.0%**
 Fair value of the VRI*: **107%**

* Assuming a 10% discount rate; Sources: IMF, MInFln, Concorde Capital research
 Note: For 2015-2020, we relied on IMF assumptions for Ukraine’s GDP deflator and exchange rate changes. For each of the years between 2021-2038, we assume a 5.5% deflator and a 2.4% devaluation of UAH vs. USD. Refer to slide 7 for more details on such assumptions.

“Simple cases”: estimate summary and caveats of the simplicity

Our simple modeling of real GDP growth allows us to conclude that with some deviation from the average growth path of GDP, the value of the VRI significantly differs from the overly simplified constant growth case.

Assuming a real GDP growth rate of between 3.5% and 4.0% in 2019-2038, everything else being equal, we conclude that the fair value of the VRI is between 55% and 93% of its par value (i.e. of the amount of the total haircut).

Key results of simple modeling

Deviation of GDP:	NPV of the VRI, % of par			Resulting CAGR for 2015-2038		
	Flat	2 cycles	3 cycles	Real GDP	-\$-GDP	
Real GDP CAGR in 2021-2038	3.0%	3%	28%	42%	3.1%	6.9%
	3.5%	22%	55%	67%	3.6%	7.3%
	4.0%	43%	84%	93%	3.9%	7.7%
	4.5%	99%	142%	145%	4.3%	8.1%
	5.0%	160%	204%	201%	4.7%	8.5%

Still not realistic

Although growth in real GDP is a defining factor for payments under the VRI, it's just one of at least three important factors.

Recall, except for real growth, the payment amount under the VRI depends heavily on:

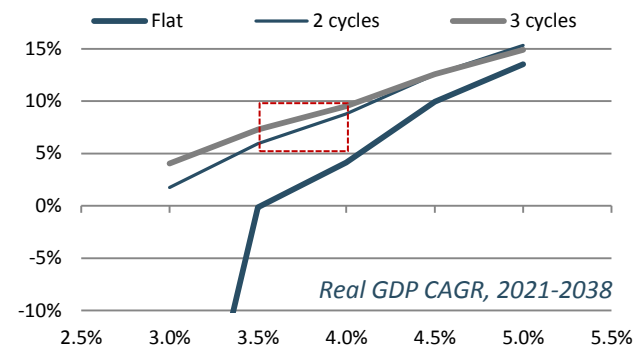
- Nominal GDP in local currency, i.e. the UAH-based deflator
- The UAH/USD exchange rate.

Each of these two factors has some magic relationship with real GDP growth, and each of them cannot remain constant when real GDP growth changes, unlike how we modeled them above.

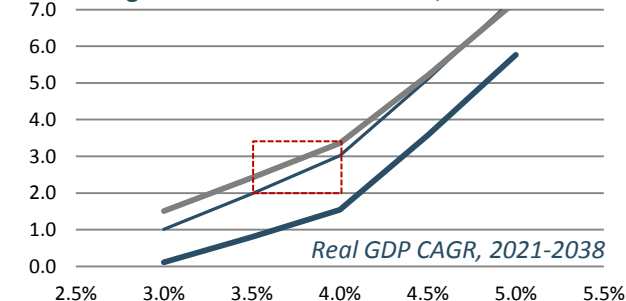
For instance, it's possible that if GDP grows faster, the national currency gets stronger and/or inflation tends to grow as well, thus magnifying the positive effect of VRI payments. That said, we claim **the above modeling could be used for evaluating the minimum value of Ukraine's GDP warrants.**

As we have no experience in modeling long-term interaction between real growth, inflation and the exchange rate, in the following slides we will apply such a combination from actual cases. Namely, we will model the payments based on Ukraine's VRI, taking into account the historic combination of these factors for the countries whose reform and growth path Ukraine is expected to repeat in the coming years.

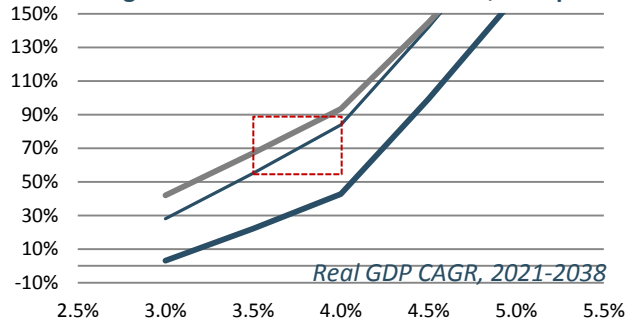
Real GDP growth and IRR of the haircut



Real GDP growth and NPV of the VRI*, USD mln



Real GDP growth and fair value of the VRI*, % of par



Modeling the true relationship: applying CEE historic metrics to Ukraine's future

We assessed how Ukraine's payments under the VRI in 2021-2040 would look like if Ukraine's macro parameters (real GDP growth, deflator and USD exchange rate change) are the same as the historic value of its peers, CEE countries.

In this case, we do not try to assume that Ukraine will perfectly repeat their path. For us, it's more important to analyze the effect on payments from Ukraine's VRI, as they have been designed by MinFin, under the realistic combination of the three VRI-determining factors.

Data selection

- We used yoy changes in just three parameters that are enough to model the VRI payments: real GDP growth, GDP deflator and UAH/USD rate.
- We took the macro parameters of Ukraine's neighboring countries: Poland, Czech Republic, Slovak Republic, Hungary, Georgia, Estonia, Latvia, Bulgaria, Romania, Turkey and Lithuania. Ukraine's own historic macro parameters were also applied, for comparison purposes.
- In our basic model, we apply the peers' three parameters for the period 1995-2016E (all taken from the IMF database) to model Ukraine's performance for 2017-2038. The exceptions are Lithuania and Georgia, for which we use 1997 (1996) - 2016E periods.
- To forecast Ukraine's parameters for 2015-2016, we used the IMF's estimates.

Key conclusions

- The main, unexpected conclusion is that the NPV of the VRI payments does not depend much on average growth in real GDP.
- The key metrics that matter, from a statistical standpoint, is average growth in dollar-denominated GDP. Indeed, this parameter encompasses all three factors that determine the payments (real growth, exchange rate and local currency inflation).
- Another important conclusion is that if Ukraine would perform in 2017-2038 as it did in 1995-2016E, its VRI would have brought USD 5.0 bln in NPV, which exceeds the amount of the haircut by 1.4x. No doubt, Ukraine will develop differently in the next two decades, with growth likely to be less volatile, but its currency would be less sticky vs. dollar. At the same time, we expect dollar growth will be faster than it had been in the last two decades, when no reforms happen.

Results of modeling

Applied cases	Real GDP CAGR*	USD GDP CAGR*	NPV of VRI***, USD bln	IRR of haircut****	Total payment, USD bln
TR 95-16E	4.1%	7.3%	7.3	15.5%	31.4
PL 95-16E	4.1%	7.6%	4.7	12.5%	17.1
CZ 95-16E	3.7%	7.2%	3.6	10.1%	13.8
RO 95-16E	2.6%	8.8%	7.5	15.7%	30.1
BG 95-16E	2.1%	8.4%	6.8	15.4%	25.5
SK 95-16E	3.9%	8.4%	8.6	17.0%	35.0
LAT 95-16E	3.8%	9.0%	17.4	25.0%	63.6
ET 95-16E	4.0%	11.0%	21.3	26.7%	81.2
GE 96-16E	5.6%	8.9%	17.0	23.1%	69.2
LIT 97-16E	4.1%	8.5%	11.4	21.5%	17.2
UA 95-16E	0.5%	4.4%	5.0	12.6%	5.0

Correlation matrix**

	USD GDP CAGR	NPV of VRI	IRR of the haircut	Total payment
Real GDP CAGR	5%	43%	37%	41%
USD GDP CAGR		86%	83%	80%
NPV of VRI			98%	80%
IRR the haircut				93%

Examples of using historic data and important conclusions

Timing is important

As we can see from the charts below, the total payments under the VRI depend not only on economic growth, but the timing of this growth: using the data for the same country but for different periods, we arrive at different VRI payment results.

This is consistent with the MinFin view that if Ukraine grows quickly in the coming years, it would be able to minimize its repayments under the VRI. However, reform-driven growth in the short term does not look likely simply because reforms are heavily delayed in Ukraine.

Just couple of years make a total result

For any country example, just 3-4 years contribute to the vast majority of total payments under the VRI. This is a good illustration that “simple case” modeling is not applicable in forecasting the VRI payments, as the link between GDP growth, inflation and the exchange rate is not linear. That also makes the modeling of the VRI payments a matter that closer resembles modeling a roulette table.

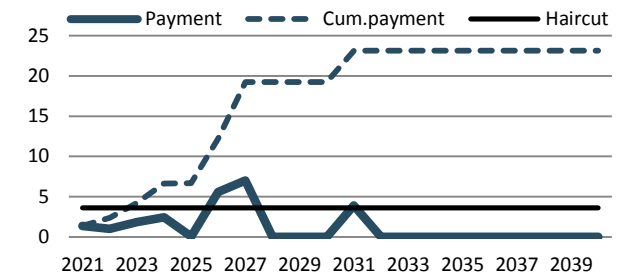
NPV of the VRI payments does not depend much on volatility and real growth itself

Contrary to the intuitive conclusion that payment under the VRI should be sensitive to real GDP growth or volatility of this growth (as any growth above 4% brings more payments than growth below 4%), the examples below suggest that this is not the case. The key thing that matters, as can be concluded from the cases in this slide and previous ones, is growth in USD-denominated GDP.

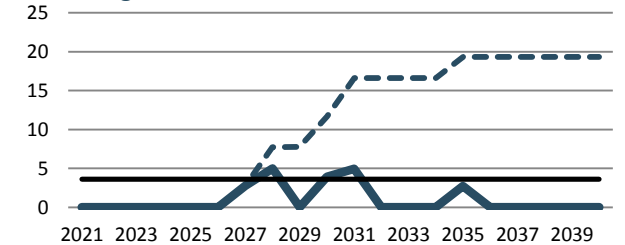
Summary of modeling

	Real GDP CAGR	\$-GDP CAGR	St.deviation. of real GDP	NPV of VRI*	IRR of haircut**
UA 01-16E	2.2%	5.9%	7.0%	8.6	20.4%
UA 97-16E	1.7%	4.3%	6.5%	5.0	12.6%
LI 95-16E	-0.3%	5.3%	14.7%	4.0	10.9%
LI 97-16E	4.1%	8.5%	5.2%	11.4	21.5%
PL 93-14	4.4%	8.6%	1.8%	5.9	14.7%
PL 95-16E	4.1%	7.6%	1.8%	4.7	12.5%

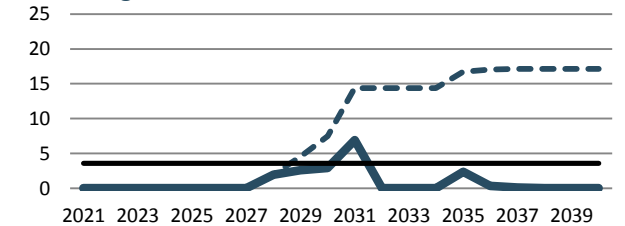
Modeling 2019-2034 as in Ukraine in 2001-2016E



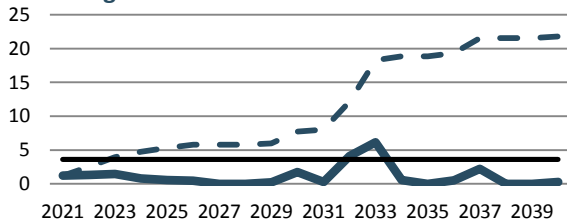
Modeling 2019-2038 as in Ukraine in 1997-2016E



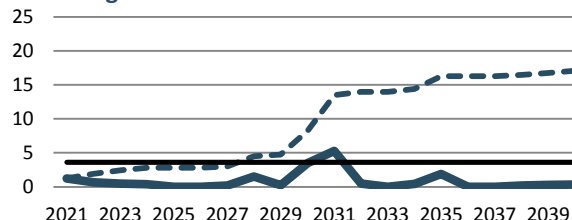
Modeling 2017-2038 as in Lithuania in 1995-2016E



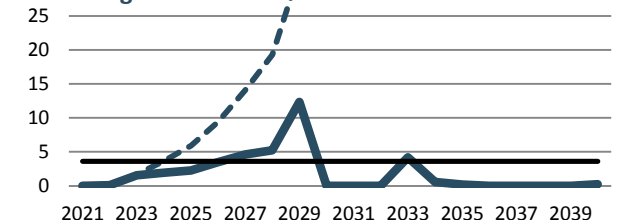
Modeling 2017-2038 as in Poland in 1993-2014



Modeling 2017-2038 as in Poland in 1995-2016E



Modeling 2017-2038 as in Lithuania in 1997-2018E



Estimating the true value of Ukraine's VRI

We modeled the expected value of the VRI as a linear function of expected dollar-denominated GDP growth for the Ukrainian economy in 2016-2038. As the result of simple modeling (slide 10), at 3.5% average real growth, 5.5% average inflation and 2.4% average weakening of the hryvnia in 2021-2038, the average USD-denominated growth for 2016-2038 would be close to 7.3%.

For valuation purposes, we conservatively assume Ukraine's growth of dollar GDP at a 7.0% CARG in 2016-2038. We don't view this figure as overly optimistic, as it's based on an assumption of 3.6% real growth for 2016-2038 and Ukraine's USD-based deflator of just 3.3% (or average hryvnia devaluation of 2.0% at the assumed UAH inflation of 6.0%). As Ukraine's reality and IMF forecasts suggest, such an estimate of a dollar inflation rate isn't aggressive.*

Regression

Of many model specifications and data sets, we select those yielding the highest explanatory power (highest possible R²) and the lowest, more conservative VRI value in the vicinity of a 7% dollar growth rate.

The resulting linear regressions chosen are:

- The application of the data sets of Ukraine's neighbors (from the table on slide 11);
- Alternatively, the application of the data of the four countries that were perfectly aligned on the chart to the right (CZ, PL, BG, RO).

Results

With the chosen regression parameters and assumed growth rates of Ukraine's dollar GDP, we derived the value of the VRI (as % of its total par value, which is USD 3.6 bln), as presented in the table.

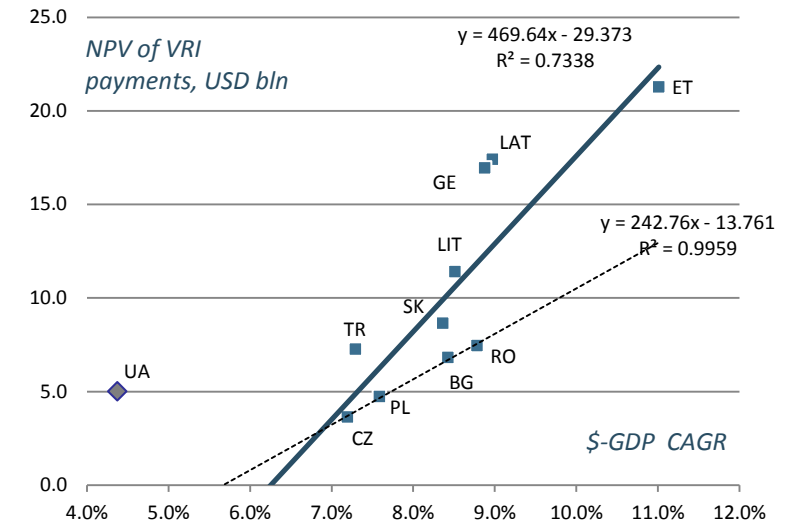
The simple average of the outcomes displayed in the table is **92%**, which is our estimate of the VRI's true value.***

Note that its sensitivity to change in growth assumptions is pretty high. At the same time, these results differ not much from our simple modeling cases (under forecasted 3.5% real growth), although they are expectedly skewed to the larger number.

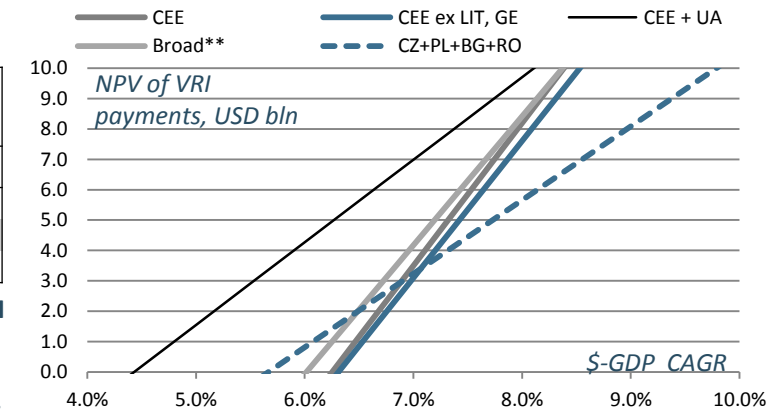
\$.GDP CAGR	Implied VRI value by regression, % of par***	
	All CEE	CZ+PL+BG+RO
6.7%	58%	49%
7.0%	97%	86%
7.3%	136%	124%

Under such scenarios, the total VRI payments will be between USD 13 bln and USD 20 bln, or less than 0.3% of Ukraine's total GDP during the payment years.

Results of modeling: chosen trend lines



Results of modeling: other trend lines



Implication for Ukrainian Eurobonds

We believe the current prices of Ukraine's Eurobonds reflect only a small portion of potential value of the VRI that bondholders could receive if MinFin's exchange offer is approved.

Based on our derived value of the VRI and assumption of a 10% discount rate, we derive the fair net present value (NPV) of all existing Ukrainian Eurobonds as follows:

Eurobond	Implied NPV	Current price	Implied return
UKRAIN 09'15	96.6	82.8	17%
UKRAIN 10'15	95.1	83.0	15%
UKRAIN 12'15	91.0	100.0	-9%
UKRAIN 06'16	91.3	78.9	16%
UKRAIN 11'16	91.8	79.4	16%
UKRAIN 07'17	91.0	79.5	14%
UKRAIN 11'17	91.9	79.5	16%
UKRAIN 09'20	93.2	81.3	15%
UKRAIN 02'21	90.3	79.0	14%
UKRAIN 11'22	92.0	79.8	15%
UKRAIN 04'23	92.7	80.5	15%
UKRINF 11'17	92.6	79.3	17%
UKRINF 12'17	92.0	79.3	16%
UKRINF04'18	92.6	79.3	17%

Appendix

Appendix I. Historic drivers for Ukraine economy: it's mostly inflation

As can be seen from the charts, Ukraine's dollar GDP grew historically much faster than its real GDP, with dollar inflation having contributed more to that growth than real GDP change. Moreover, dollar inflation was especially high during the time of high real GDP growth, thus magnifying the effect of dollar growth in the "fat" years.

While stating this, we also have to stress that:

- Dollar inflation in Ukraine, whose economy is heavily reliant on commodity exports, depended heavily on agri- and steel commodities.
- One of the important sources of high dollar inflation was the sticky UAH/USD rate that was pursued by the government, as well as high UAH-based inflation.

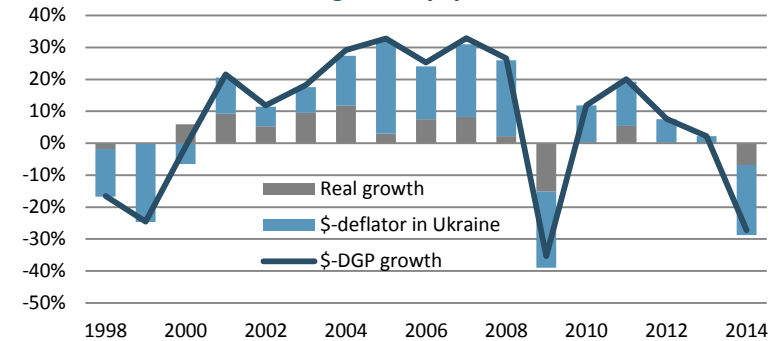
This is actually the core reason why Ukraine is an outlier on the CEE countries' growth and VRI relationship (as illustrated on slide 13). And this is the core reason why Ukraine's past is hardly applicable to model its future.

We expect that in the future, assuming no commodity booms, dollar inflation in Ukraine won't be double-digit. However, we expect it will continue to be higher than dollar inflation in the U.S. (about 2.0%), due to an interest rate parity effect. In our modelling, we assume that dollar inflation in Ukraine will be 3.0% in 2021-2038, which is below historical rates (as presented in the table) and much below the IMF's forecast for 2016-2020 (7.8%). Based on such assumptions, the resulting dollar inflation for 2016-2038 would be 3.6%. For the purposes of valuation (slide 13), we assume more conservative dollar inflation (+3.3% in 2016-2038).

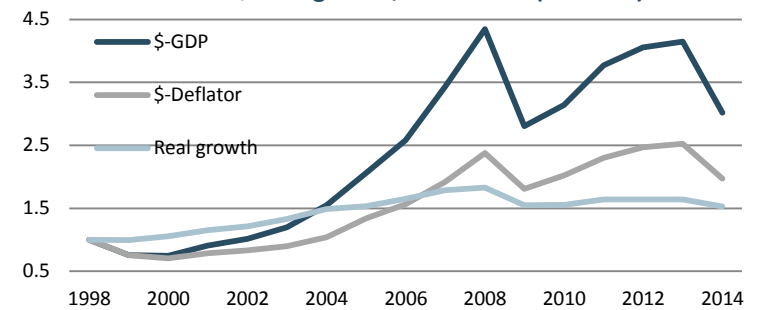
Drivers of dollar GDP in Ukraine

	\$-GDP CAGR	Real GDP CAGR	\$-Deflator CAGR
'92-'12	10.9%	-1.0%	12.0%
'93-'13	8.5%	-0.2%	8.8%
'94-'14	6.4%	0.7%	5.6%
'95-'15	4.1%	1.1%	3.0%
'96-'15	3.3%	1.7%	1.6%
'97-'15	2.8%	2.0%	0.8%
'98-'15	4.1%	2.2%	1.8%
'99-'15	6.2%	2.3%	3.8%
'00-'15	6.7%	2.1%	4.5%
'01-'15	5.7%	1.6%	4.0%

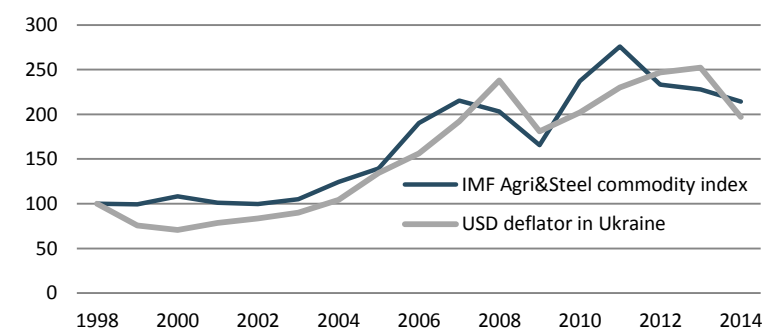
Drivers of Ukraine's \$-GDP growth, yoy



Drivers of Ukraine's \$-GDP growth, cumulative (1998 = 1)



Ukraine USD deflator and commodity prices (1998=100)



Appendix II. Examples of modeling payments under the VRI

Simple modeling: 3.5% constant real GDP growth with three cycles

	2014	2015*	2016*	2017*	2018*	2019*	2020*	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Nominal GDP, UAH bln	1567	1850	2087	2356	2626	2896	3194	3370	3808	4158	4541	4958	5414	5911	6455	6810	7696	8403	9176	10019	10940	11946	13044	13762	15553	16982	18543
UAH deflator	14.8%	25.0%	10.6%	9.0%	7.2%	6.0%	6.0%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%	5.5%
Real growth	-6.8%	-5.5%	2.0%	3.5%	4.0%	4.0%	4.0%	0.0%	7.1%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	0.0%	7.1%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	0.0%	7.1%	3.5%	3.5%
UAH devaluation vs. USD	-32.9%	-45.2%	-3.4%	-2.6%	-1.4%	-0.5%	-0.5%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%	-2.4%
UAH/USD	11.9	21.8	22.5	23.1	23.5	23.6	23.7	24.3	24.9	25.5	26.1	26.7	27.3	28.0	28.7	29.4	30.1	30.8	31.5	32.3	33.1	33.9	34.7	35.5	36.4	37.3	38.1
Nominal GDP, USD bln	131.4	85.0	92.7	101.9	111.9	122.8	134.7	138.8	153.2	163.3	174.1	185.7	198.0	211.1	225.1	231.9	255.9	272.9	290.9	310.2	330.8	352.7	376.1	387.4	427.6	455.9	486.1
Reference year's payment amount, UAH bln						0.0	5.0	0.0	38.1	3.0	3.3	3.6	3.9	4.3	4.7	0.0	100.5	6.1	6.6	7.3	7.9	8.7	9.5	0.0	203.1		
Portion multiplied by 15%						0.0	30.7	0.0	35.5	20.1	21.9	24.0	26.2	28.6	31.2	0.0	71.8	40.6	44.3	48.4	52.9	57.7	63.0	0.0	145.2		
Portion multiplied by 40%						0.0	0.9	0.0	111.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	224.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	453.3		
Payment cap (1% of GDP)						29.0	31.9	33.7	38.1	41.6																	
Minimum GDP threshold: USD 125.4 bln						no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
Payment year's payment amount, USD bln								0.0	0.2	0.0	1.5	0.1	0.1	0.1	0.1	0.1	0.2	0.0	3.2	0.2	0.2	0.2	0.2	0.2	0.3	0.0	5.4
Effective exchange rate, UAH/USD ***								23.9	24.5	25.1	25.7	26.3	27.0	27.6	28.3	29.0	29.6	30.4	31.1	31.8	32.6	33.4	34.2	35.0	35.9	36.7	37.6

Applying Ukraine's historic data for 1995-2016E instead of forecasts for 2017-2038

	2014*	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*		
Nominal GDP, UAH bln	1567	1850	2087	9454	14137	16191	17791	22621	29493	35410	39260	46507	59954	76684	94742	125945	166142	158799	180985	218178	235536	245686	262709	310196	350027		
UAH deflator**	14.8%	25.0%	10.6%	415.5%	65.9%	18.3%	11.9%	27.4%	23.1%	9.9%	5.3%	8.2%	15.3%	24.1%	14.9%	22.8%	29.0%	12.6%	13.7%	14.3%	7.7%	4.3%	14.8%	25.0%	10.6%		
Real growth**	-6.8%	-5.5%	2.0%	-12.1%	-9.9%	-3.2%	-1.8%	-0.2%	5.9%	9.2%	5.3%	9.5%	11.8%	3.1%	7.6%	8.2%	2.2%	-15.1%	0.3%	5.5%	0.2%	0.0%	-6.8%	-5.5%	2.0%		
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	-77.8%	-19.5%	-1.7%	-24.0%	-40.7%	-24.1%	1.3%	0.9%	-0.1%	0.3%	3.8%	1.4%	0.0%	-4.1%	-32.4%	-1.8%	-0.4%	-0.3%	-2.0%	-32.0%	-44.6%	-3.3%		
UAH/USD	11.9	21.8	22.5	101.2	125.7	127.9	168.3	283.8	373.8	369.1	366.0	366.4	365.4	351.9	346.9	346.9	361.6	535.3	545.2	547.4	549.2	560.6	823.8	1487.5	1538.1		
Nominal GDP, USD bln	131.4	85.0	92.8	93.4	112.5	126.6	105.7	79.7	78.9	95.9	107.3	126.9	164.1	217.9	273.1	363.0	459.4	296.7	332.0	398.6	428.8	438.3	318.9	208.5	227.6		
Reference year's payment amount, UAH bln						0.0	0.0	0.0	0.0	0.0	1000.8	1752.6	8.0	1390.3	2137.2	0.0	0.0	0.0	1523.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Portion multiplied by 15%						0.0	0.0	0.0	0.0	0.0	0.0	424.7	536.3	53.0	880.7	1163.8	0.0	0.0	0.0	2068.7	0.0	0.0	0.0	0.0	0.0	0.0	
Portion multiplied by 40%						0.0	0.0	0.0	0.0	0.0	2342.7	4180.5	0.0	3145.4	4906.6	0.0	0.0	0.0	3031.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Payment cap (1% of GDP)						161.9	177.9	226.2	294.9	354.1																	
Minimum GDP threshold: USD 125.4 bln						yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
Payment year's payment amount, USD bln								0.0	0.0	0.0	0.0	0.0	0.0	2.8	5.0	0.0	3.9	5.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	
Effective exchange rate, UAH/USD ***								214.5	319.8	371.9	367.8	366.1	366.0	360.0	349.9	346.9	352.8	431.1	539.2	546.1	548.1	553.8	665.9	1089.3	1507.8	1538.1	1538.1

Appendix II. Examples of modeling payments under the VRI, continued (1)

Applying Poland's historic data for 1995-2016E instead of forecasts for 2017-2038

	2014	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*					
Nominal GDP, UAH bln	1567	1850	2087	2987	3742	4565	5323	5897	6594	6906	7181	7494	8215	8725	9436	10513	11315	12064	12733	13763	14315	14724	15279	15853	16626					
UAH deflator**	14.8%	25.0%	10.6%	34.1%	17.9%	13.9%	11.1%	6.0%	7.3%	3.5%	2.5%	0.8%	4.3%	2.6%	1.8%	3.9%	3.6%	3.9%	1.8%	3.2%	2.2%	1.2%	0.5%	0.3%	1.4%					
Real growth**	-6.8%	-5.5%	2.0%	6.7%	6.2%	7.1%	5.0%	4.5%	4.3%	1.2%	1.4%	3.6%	5.1%	3.5%	6.2%	7.2%	3.9%	2.6%	3.7%	4.8%	1.8%	1.7%	3.3%	3.5%	3.5%					
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	-6.3%	-10.1%	-17.8%	-6.1%	-12.0%	-8.7%	6.2%	0.3%	4.9%	6.4%	13.0%	4.3%	12.2%	14.8%	-22.7%	3.4%	1.8%	-8.9%	3.0%	0.1%	-14.1%	0.0%					
UAH/USD	11.9	21.8	22.5	24.0	26.7	32.5	34.6	39.3	43.0	40.5	40.4	38.5	36.2	32.0	30.7	27.4	23.9	30.9	29.9	29.3	32.2	31.3	31.2	36.4	36.4					
Nominal GDP, USD bln	131.4	85.0	92.8	124.5	140.2	140.6	154.0	150.1	153.3	170.4	177.8	194.6	227.0	272.4	307.2	384.0	474.4	390.9	426.4	469.0	444.4	470.7	489.1	436.0	457.3					
Reference year's payment amount, UAH bln							45.7	27.5	20.3	16.1	0.0	0.0	6.1	47.2	6.9	91.3	140.3	15.0	0.0	12.9	59.7	0.0	0.0	6.7	11.1	11.6				
Portion multiplied by 15%							42.6	50.7	56.4	63.2	0.0	0.0	40.7	78.1	46.1	88.9	98.1	100.2	0.0	85.8	131.4	0.0	0.0	44.6	74.0	77.0				
Portion multiplied by 40%							131.6	49.8	29.6	16.4	0.0	0.0	88.7	0.0	194.8	314.0	0.0	0.0	0.0	100.1	0.0	0.0	0.0	0.0	0.0	0.0				
Payment cap (1% of GDP)							45.7	53.2	59.0	65.9	69.1																			
Minimum GDP threshold: USD 125.4 bln							yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes			
Payment year's payment amount, USD bln									1.3	0.7	0.5	0.4	0.0	0.0	0.2	1.5	0.2	3.5	5.3	0.5	0.0	0.4	1.9	0.0	0.0	0.2	0.3	0.3		
Effective exchange rate, UAH/USD ***									36.5	40.8	42.0	40.5	39.6	37.6	34.5	31.5	29.4	26.0	26.7	30.5	29.7	30.5	31.8	31.3	33.3	36.4	36.4	36.4		

Applying Latvia's historic data for 1995-2016E instead of forecasts for 2017-2038

	2014	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040			
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*					
Nominal GDP, UAH bln	1567	1850	2087	2349	2711	3120	3473	3604	3935	4315	4864	5545	6449	7898	9915	13084	14166	10969	10547	11784	12797	13482	13968	14525	15260					
UAH deflator**	14.8%	25.0%	10.6%	14.9%	12.6%	5.8%	4.8%	1.6%	3.7%	2.3%	5.2%	4.9%	6.8%	11.2%	12.5%	20.2%	11.8%	-9.8%	-1.0%	6.4%	3.6%	1.1%	1.2%	1.8%	1.7%					
Real growth**	-6.8%	-5.5%	2.0%	-2.1%	2.5%	8.8%	6.3%	2.2%	5.3%	7.2%	7.2%	8.6%	8.9%	10.2%	11.6%	9.8%	-3.2%	-14.2%	-2.9%	5.0%	4.8%	4.2%	2.4%	2.2%	3.3%					
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	6.1%	-4.2%	-5.2%	-1.5%	0.8%	-3.5%	-3.4%	1.6%	8.2%	5.8%	-4.2%	0.7%	9.1%	7.2%	-5.1%	-4.8%	5.7%	-8.4%	3.3%	0.1%	-14.5%	0.0%					
UAH/USD	11.9	21.8	22.5	21.2	22.1	23.4	23.7	23.5	24.4	25.3	24.8	23.0	21.7	22.7	22.5	20.6	19.2	20.3	21.3	20.1	22.0	21.3	21.3	24.9	24.9					
Nominal GDP, USD bln	131.4	85.0	92.8	110.7	122.4	133.5	146.5	153.2	161.4	170.9	195.7	241.3	296.8	348.3	440.2	634.0	735.9	540.8	495.2	585.1	582.1	633.3	656.7	583.8	613.3					
Reference year's payment amount, UAH bln							31.2	34.6	0.0	25.6	43.1	64.7	102.2	125.3	187.8	284.0	294.1	0.0	0.0	0.0	61.7	59.0	31.1	0.0	0.0	7.2				
Portion multiplied by 15%							28.7	32.7	0.0	37.4	40.3	45.4	51.0	59.2	71.7	88.8	119.2	0.0	0.0	0.0	112.2	122.1	129.4	0.0	0.0	48.2				
Portion multiplied by 40%							137.2	74.3	0.0	50.1	127.1	144.7	236.3	291.2	442.5	676.7	690.5	0.0	0.0	0.0	112.0	101.8	29.2	0.0	0.0	0.0				
Payment cap (1% of GDP)							31.2	34.7	36.0	39.4	43.1																			
Minimum GDP threshold: USD 125.4 bln							yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes			
Payment year's payment amount, USD bln									1.3	1.5	0.0	1.0	1.8	2.9	4.6	5.5	8.6	14.1	15.0	0.0	0.0	0.0	2.8	2.8	1.4	0.0	0.0	0.3		
Effective exchange rate, UAH/USD***									23.6	23.9	24.7	25.1	24.1	22.5	22.1	22.6	21.8	20.1	19.7	20.7	20.8	20.9	21.7	21.3	22.7	24.9	24.9	24.9		

Appendix II. Examples of modeling payments under the VRI, continued (2)

Applying Slovakia's historic data for 1995-2016E instead of forecasts for 2017-2038

	2014	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040		
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*				
Nominal GDP, UAH bln	1567	1850	2087	2451	2731	3028	3307	3540	3919	4255	4632	5144	5727	6251	6965	7796	8454	7913	8336	8702	8954	9128	9329	9590	10003				
UAH deflator**	14.8%	25.0%	10.6%	8.9%	4.2%	6.2%	5.0%	7.3%	9.4%	5.1%	4.0%	5.4%	5.8%	2.5%	2.9%	1.1%	2.8%	-1.2%	0.5%	1.6%	1.3%	0.5%	-0.2%	-0.1%	0.9%				
Real growth**	-6.8%	-5.5%	2.0%	7.9%	6.9%	4.4%	4.0%	-0.2%	1.2%	3.3%	4.7%	5.4%	5.2%	6.5%	8.3%	10.7%	5.4%	-5.3%	4.8%	2.7%	1.6%	1.4%	2.4%	2.9%	3.3%				
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	7.8%	-3.1%	-8.8%	-4.6%	-14.6%	-10.0%	-5.1%	7.0%	23.1%	13.9%	4.0%	4.5%	20.3%	15.9%	-1.7%	-4.7%	4.9%	-7.6%	3.3%	0.1%	-14.2%	0.0%				
UAH/USD	11.9	21.8	22.5	20.9	21.5	23.6	24.7	29.0	32.2	34.0	31.7	25.8	22.6	21.8	20.8	17.3	14.9	15.2	16.0	15.2	16.5	15.9	15.9	18.6	18.6				
Nominal GDP, USD bln	131.4	85.0	92.8	117.5	126.8	128.3	133.6	122.1	121.6	125.3	145.9	199.5	253.1	287.3	334.5	450.4	565.9	520.7	522.5	572.0	543.8	572.8	585.8	517.0	539.2				
Reference year's payment amount, UAH bln							9.5	4.7	0.0	0.0	0.0	19.3	34.9	35.2	68.4	119.3	198.8	58.4	0.0	38.3	0.0	0.0	0.0	0.0	0.0	5.1			
Portion multiplied by 15%							29.0	31.6	0.0	0.0	0.0	44.2	48.8	54.4	58.7	64.3	70.4	80.2	0.0	79.5	0.0	0.0	0.0	0.0	0.0	33.8			
Portion multiplied by 40%							12.9	0.0	0.0	0.0	0.0	31.6	68.9	67.5	149.0	274.1	470.6	115.9	0.0	65.8	0.0	0.0	0.0	0.0	0.0	0.0			
Payment cap (1% of GDP)							30.3	33.1	35.4	39.2	42.6																		
Minimum GDP threshold: USD 125.4 bln							yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes		
Payment year's payment amount, USD bln									0.4	0.2	0.0	0.0	0.0	0.8	1.6	1.6	3.5	7.3	13.2	3.8	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.3	
Effective exchange rate, UAH/USD***									26.4	30.3	32.9	33.1	29.4	24.5	22.3	21.4	19.4	16.4	15.0	15.5	15.7	15.7	16.3	15.9	17.0	18.6	18.6	18.6	

Applying Czech historic data for 1995-2016E instead of forecasts for 2017-2038

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*			
Nominal GDP, UAH bln	1567	1850	2087	2694	3090	3330	3653	3814	4045	4369	4560	4775	5213	5554	5979	6532	6845	6686	6740	6857	6900	6969	7273	7529	7844			
UAH deflator**	14.8%	25.0%	10.6%	-6.8%	10.0%	8.5%	10.0%	2.9%	1.7%	4.8%	2.7%	1.1%	4.0%	0.1%	0.7%	3.5%	2.0%	2.6%	-1.5%	-0.2%	1.4%	1.7%	2.3%	1.0%	1.4%			
Real growth**	-6.8%	-5.5%	2.0%	38.5%	4.3%	-0.7%	-0.3%	1.4%	4.3%	3.1%	1.6%	3.6%	4.9%	6.4%	6.9%	5.5%	2.7%	-4.8%	2.3%	2.0%	-0.8%	-0.7%	2.0%	2.5%	2.7%			
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	8.3%	-2.2%	-14.4%	-1.8%	-6.6%	-10.4%	1.5%	16.2%	16.1%	9.8%	7.3%	6.0%	11.3%	18.9%	-10.4%	-0.2%	7.9%	-9.6%	0.0%	-5.7%	-13.0%	0.0%			
UAH/USD	11.9	21.8	22.5	20.8	21.2	24.8	25.3	27.1	30.2	29.8	25.6	22.1	20.1	18.7	17.7	15.9	13.4	14.9	14.9	13.8	15.3	15.3	16.2	18.7	18.7			
Nominal GDP, USD bln	131.4	85.0	92.8	129.7	145.5	134.2	144.6	141.0	133.9	146.8	178.0	216.3	259.2	296.3	338.1	411.3	512.4	448.2	451.0	495.2	450.4	455.0	448.0	403.5	420.4			
Reference year's payment amount, UAH bln							0.0	0.0	0.0	10.4	0.3	0.0	4.2	26.3	58.8	72.8	47.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portion multiplied by 15%							0.0	0.0	0.0	38.8	2.2	0.0	27.7	49.7	52.2	55.9	61.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Portion multiplied by 40%							0.0	0.0	0.0	11.4	0.0	0.0	0.0	47.1	127.4	160.9	94.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Payment cap (1% of GDP)							33.3	36.5	38.1	40.4	43.7																	
Minimum GDP threshold: USD 125.4 bln							yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Payment year's payment amount, USD bln									0.0	0.0	0.0	0.4	0.0	0.0	0.2	1.4	3.5	4.9	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Effective exchange rate, UAH/USD ***									26.0	28.3	30.0	28.1	24.2	21.3	19.6	18.3	17.0	14.9	14.0	14.9	14.5	14.4	15.3	15.7	17.2	18.7	18.7	18.7

Appendix II. Examples of modeling payments under the VRI, continued (3)

Applying Georgia's historic data for 1996-2016E instead of forecasts for 2017-2037

	2014	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Historic year applied				1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*				
Nominal GDP, UAH bln	1567	1850	2087	3286	3963	4306	4840	5137	5679	6369	7317	8393	9929	11781	14519	16297	15367	17723	20799	22356	22938	24936	26369	27886	n.a.			
UAH deflator**	14.8%	25.0%	10.6%	42.5%	9.1%	5.6%	9.2%	4.1%	5.5%	6.3%	3.4%	8.4%	7.9%	8.5%	9.5%	9.4%	-2.0%	8.6%	9.5%	1.0%	-0.7%	3.8%	3.7%	3.7%	n.a.			
Real growth**	-6.8%	-5.5%	2.0%	10.5%	10.6%	2.9%	2.9%	1.9%	4.8%	5.5%	11.1%	5.9%	9.6%	9.4%	12.6%	2.6%	-3.7%	6.2%	7.2%	6.4%	3.3%	4.8%	2.0%	2.0%	n.a.			
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	2.0%	-2.6%	-6.8%	-31.1%	2.2%	-4.7%	-5.6%	2.3%	12.0%	5.7%	1.8%	6.6%	12.1%	-10.8%	-6.3%	5.7%	2.1%	-0.7%	-5.8%	-20.8%	-20.8%	n.a.			
UAH/USD	11.9	21.8	22.5	22.1	22.7	24.3	35.3	34.5	36.2	38.4	37.5	33.5	31.7	31.1	29.2	26.0	29.2	31.1	29.5	28.8	29.1	30.8	38.9	49.2	n.a.			
Nominal GDP, USD bln	131.4	85.0	92.8	148.9	174.8	177.0	137.1	148.8	156.7	166.0	195.2	250.7	313.5	378.7	497.5	625.7	526.5	569.1	705.9	774.9	789.3	808.6	677.2	567.1	n.a.			
Reference year's payment amount, UAH bln				0.0	0.0	0.0	25.2	45.4	195.8	70.6	216.8	247.7	462.1	0.0	0.0	171.9	276.3	233.2	10.7	108.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Portion multiplied by 15%				0.0	0.0	0.0	54.2	60.4	65.9	79.3	90.6	107.7	129.0	0.0	0.0	166.9	194.0	210.1	71.1	238.0	0.0	0.0	0.0	0.0	0.0	0.0		
Portion multiplied by 40%				0.0	0.0	0.0	42.8	91.0	464.9	146.8	508.2	578.9	1107.0	0.0	0.0	367.2	618.0	504.2	0.0	181.6	0.0	0.0	0.0	0.0	0.0	0.0		
Payment cap (1% of GDP)				43.1	48.4	51.4	56.8	63.7																				
Minimum GDP threshold: USD 125.4 bln				yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes		
Payment year's payment amount, USD bln				0.0	0.0	0.0	0.7	1.3	6.0	2.2	7.1	8.9	16.9	0.0	0.0	5.9	9.5	7.8	0.3	2.5	0.0	0.0	0.0	0.0	0.0	0.0		
Effective exchange rate, UAH/USD ***				35.0	35.2	37.1	38.0	35.9	32.8	31.4	30.3	27.9	27.3	30.0	30.5	29.2	28.9	29.8	34.1	43.0	49.6	-	-	-	-	-		

Applying Bulgaria's historic data for 1995-2016E instead of forecasts for 2017-2038

	2014*	2015*	2016*	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Historic year applied				1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*			
Nominal GDP, UAH bln	1567	1850	2087	3496	6994	69229	89040	94479	106243	117092	127193	136999	152974	172816	196604	233654	267121	264395	269423	293888	299927	300811	307865	308357	314942			
UAH deflator**	14.8%	25.0%	10.6%	70.2%	117.6%	951.3%	23.5%	3.7%	6.7%	6.2%	4.0%	2.2%	4.8%	6.6%	6.9%	11.2%	8.1%	4.2%	1.2%	7.0%	1.6%	-0.8%	0.6%	-1.0%	0.6%			
Real growth**	-6.8%	-5.5%	2.0%	-1.6%	-8.0%	-5.8%	4.1%	2.3%	5.4%	3.8%	4.5%	5.4%	6.6%	6.0%	6.5%	6.9%	5.8%	-5.0%	0.7%	2.0%	0.5%	1.1%	1.7%	1.2%	1.5%			
UAH devaluation vs. USD**	-32.9%	-45.2%	-3.3%	0.0%	-62.2%	-89.4%	-3.7%	-4.8%	-13.4%	-3.1%	5.4%	19.7%	9.9%	0.2%	0.8%	9.2%	7.4%	-5.4%	-4.7%	4.9%	-7.6%	3.3%	0.1%	-14.5%	0.0%			
UAH/USD	11.9	21.8	22.5	22.5	59.6	563.3	584.7	614.0	709.0	731.5	693.7	579.3	526.9	525.9	521.7	478.0	445.1	470.4	493.7	470.8	509.6	493.3	492.9	576.1	576.1			
Nominal GDP, USD bln	131.4	85.0	92.8	155.4	117.4	122.9	152.3	153.9	149.9	160.1	183.4	236.5	290.3	328.6	376.8	488.9	600.1	562.1	545.7	624.2	588.6	609.8	624.6	535.2	546.6			
Reference year's payment amount, UAH bln				0.0	168.7	0.0	713.7	134.9	417.3	900.3	1685.4	1519.8	2102.4	2868.7	2152.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Portion multiplied by 15%				0.0	855.2	0.0	1008.0	899.4	1217.4	1300.3	1435.6	1631.0	1846.5	2185.6	2525.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Portion multiplied by 40%				0.0	101.1	0.0	1406.2	0.0	586.7	1763.2	3675.3	3187.8	4563.5	6352.2	4434.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Payment cap (1% of GDP)				692.3	890.4	944.8	1062.4	1170.9																				
Minimum GDP threshold: USD 125.4 bln				no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes		
Payment year's payment amount, USD bln				0.0	0.3	0.0	1.0	0.2	0.7	1.7	3.2	3.0	4.5	6.3	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Effective exchange rate, UAH/USD ***				596.4	652.0	718.0	716.4	647.9	558.4	526.5	524.2	504.2	464.8	455.2	479.7	484.6	486.3	503.1	493.1	526.2	576.1	576.1	576.1	576.1	576.1	576.1		

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