

# Independence of Central Banks in Commodity Economies

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*This article introduces the hypothesis that resource-rich countries display a low degree of central bank independence (CBI). This hypothesis is proven based on multivariable regression, but the influence of resource factors is not considered strong enough compared with previous inflationary experience and the characteristics of the political regime. It stresses that the impact of the commodity wealth factor on CBI choice is direct (through the share of commodity exports in total export) and indirect through the lower level of democracy in commodities countries that feature more dependent central banks. Also, this hypothesis is proven based on the grouping of countries. Such grouping shows that despite a general tendency of CBI increase in the world, a group of commodity exporting countries experiencing a substantially lower level of mean GMT-index, ECWN-index, and transparency-index resulted in lower CBI compared with groups of emerging markets and developing countries. Explaining these phenomena is rooted in features of institutional distortions in commodity economies, the specific structure of interventionist policy to overcome a “resource curse,” and the specific role of the exchange rate and FX reserves in intertemporal macroeconomic policy.*

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**Key words:** central bank independence, indexes of central bank independence, “resource curse”, commodities export, exchange reserves, exchange rates, quality of institutions.

## A. Introduction

The instability of price trends for commodities increasingly corresponds to strengthening of globally-centric determinants of behavior of primary resources markets. Scales of fluctuations of prices for commodities, synchronization of cycles of price trends with the global liquidity cycle, and strengthening of the relationship between world prices for commodities, capital flows, and global financial imbalances prove that resource-rich countries, for which the export of commodities or semi-finished products made from them is important to the economy’s structure, fall within a qualitatively different macrofinancial framework compared to countries, where fluctuations in terms of trade are not so essential and these fluctuations are not followed by significant changes of capital flows and their allocation. It is not a coincidence that, building on already established concepts of “Dutch disease” and “resource curse,” the interests of commodity-exporting countries for macroeconomics has significantly risen during the last decade. It is proven both by special investigations of international financial organizations on optimal fiscal regimes for resource-rich countries and inclusive growth and steady development. In numerous publications, macroeconomic dilemmas of these countries are actually considered from a different point of view. The institutional, political, and economic aspects of analysis of the macroeconomic profile of commodity economies indicate that the benefits of “rent seeking” fully deform macroeconomic policy, due to which conventional macroeconomic tools often become direct welfare redistribution levers. Monetary policy authorities can be directly involved in redistributive political dilemmas or into realization of infrastructural projects and projects for economic diversification. The status of the central bank in commodity economies is being distorted under the influence of institutional deformities.

First, the central bank can come under pressure on account of the impact of serious fluctuations of commodity prices on internal monetary processes. A combination of serious fluctuations of export prices with fluctuations of terms of trade and reverses of capital flows should somehow correlate how the behavior of aggregate demand is being transmitted to inflation, economic growth, and employment. Analogously, how inflation behavior impacts export sector competitiveness through its

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impact on the real effective exchange rate is of the same importance. It is conceivable that scales of fluctuations of commodity prices and reverses of capital flows for the last 20 years are such that they inevitably influence inflation (deflation) pressure with appropriate consequences for formation of the inflation level as a medium-term tendency. In contrast to inflationary trends, given the level of commodity prices in global terms, the status of central banks can play a compensatory role that theoretically is more important than in other countries due to the procyclical nature of fluctuations of world commodity prices. Second, the institutional differences of commodity economies is precisely why therein may consist an almost completely different nature of the relationship between the status of monetary authorities and macroeconomic choice. The mode of monetary and fiscal policy may be deformed owing to “rent seeking” (or protection of already “captured” rent) or to the necessity to implement a specific structural policy with purposes that may contradict conventional support of price stability by an independent central bank. Peculiarities of “external wealth” management also influence the specific institutional field of central bank operations. A conclusion can be made that the level of CBI in commodity economies will be lower due to institutional deformities related to commodity wealth. Additionally, it is conceivable that the level of commodity wealth may indirectly impact the independence level and directly through the quality of institutions and existing political regime.

Considering the increasing role of the commodities sector in Ukraine (the role of metallurgy diminishes to some extent, and the role of agriculture increases in its place) and the expectation for transformation of the domestic agricultural complex into a global power (on one hand, there are relative benefits, on the other, there is global demand), the subjects of research on macroeconomic and institutional patterns in functioning resource-rich economies are of particular emphasis. Matters that reveal differences in basic institutional patterns of central banks in exporting countries alongside other countries and theoretic interpretation of such deviations are becoming more urgent.

The purpose of the article is to explain the lower level of CBI in commodity economies and to provide its empirical confirmation. This is especially urgent because, in the recent past, structural reforms in many countries have testified that there is a general trend to increase the autonomy level of monetary authorities.

In this article, the following hypothesis is made: in resource-rich countries there are specific macroeconomic priorities and institutional deformities affecting the favor of selection of a lower level CBI, because a lower level of monetary autonomy is considered more functional. Theoretical arguments to the advantage of implementing a functionally less independent central bank, considering the general trend for increased monetary autonomy across the world, require further investigation. Empirical confirmation of a lower level of monetary autonomy will be supported by an intergroup comparison and a regression model. If in a group of resource-rich countries the average level of CBI measured by means of an appropriate index is lower than on the average in a group of emerging market countries, it will demonstrate lower monetary autonomy. Regression analysis is intended to verify this dependence in a broad range of countries.

This article has the following structure: the next chapter contains a review of literature on the matters of empirical verification of the independence of central banks and the specific nature of macroeconomic analysis of commodity economies; chapter C presents a theoretical explanation of the functional view on more dependent central banks and an overview of the predominant trend for the rise of independence of central banks is offered; in chapter D, empirical verification of the hypothesis of a lower level of CBI in commodity-rich countries is made; and chapter E provides conclusions.

## B. Theoretical framework of the investigation: review of literature

### 1. Independence of central banks and inflation: inside and outside the consensus

Canonical investigations into the problem of the role of monetary authorities' status in determining inflation levels, which may be considered the first generation of such explorations in this direction, can be summarized as follows (Grilli et al (1991), Cukierman et al (1992), Eijffinger and Schaling (1993)):

- a) The level of CBI is important for the inflation level and actually is neutral to rates of economic development;
- b) The positive influence of monetary authorities' status on economic growth is provided by its relevance to the disinflation process and achievement of a fair monetary policy that is confirmed particularly clearly by the experiences of emerging market countries, in particular, post-socialistic European countries;
- c) The proximity of the relationship between the index measuring the level of CBI and the inflation level is the closest in developed countries, which is caused by differences between the formal and the actual status;
- d) Additional identifiers of the actual status (the coefficient that determines a leader's actual term in office

compared to the term stipulated by law –called the TOR-index) allows for understanding political and economic factors of the weak theoretically predictable connection between the index and inflation better; and

e) The proximity of the relationship may be sufficiently sensitive to the nature of the index specification that is a reflection of more complex social interactions between public choices, governmental institutions, and the central bank.

Further investigations, which can be considered furtherances of the first generation of explorations, pay special attention to the following matters.

First, standardization of CBI components and distinguishing the “best practices” (Lybeck (1998)) takes place in a more system-related context than the exceptional contrast of political and economic independence, as it has been shown in the famous work of DeBelle and Fischer (1994). At the same time, panoramic investigations fall outside the scope for application of the currently canonical GMT-index (GMT – from Grilli, Masciando, Tabellini (Grilli et al. (1991)) (see Cukierman (2008), Siklos (2002), and Kozyuk (2004)).

Second, cases of developed countries’ proximity of the relationship between the independence index and inflation may seem to be weak due to a reduction of a group variation of inflation. Thus, when inflation becomes more globally-centric, the role of monetary authorities’ status may be significantly diminished. For instance, so-called global disinflation and acknowledgement of a lower inflation level is more optimal in time of a higher level of openness (review and analysis of this problem is represented in Koziuk (2009)) may decrease the inflation level regardless of changes in the formal status directly or by changing the driving factors of policy that need not be approved by legislation. Some researchers argue that standard regression models analyzing relationship between the inflation level and the independence index do not always work. Quintile regressions are more efficient, but even they do not always give results adequate for interpretation. The main reason for this is an essential difference in the nature of distribution of inflation in the world and the nature of distribution of the index, which is measured monetary autonomy (Siklos 2008).

Third, changes in the status of central banks is a component of broader structural reforms related to the search for institutional variants for adaptation to a more aggressive global competitive environment or to the imperfections of global capital markets. It is not a coincidence that detecting changes in the status of a regional perspective does not cast doubts that increases of the level of CBI (both political and economic) is a global trend (Jacome (2001), Jacome et al (2005), Arnone et al (2006, 2007)).

Fourth, the global financial crisis increased strain over the matter of independence of monetary authorities in light of the format of unconventional monetary policy realization, “fiscal domination,” and the appearance of the new phenomena of “financial domination” and “domination of expectations”. Despite the fact that no formal changes in the direction of reducing the level of CBI coexists with actual consent for a more accommodative policy, the debate on allotment of monetary authorities’ powers to apply macroprudential tools nevertheless may be seen as the preservation the concept of monetary authorities’ autonomy (Koziuk (2015), Jacome and Mancini-Griffoli (2014)). In light of post-crisis changes in the status of monetary authorities, there is a well-defined tendency of a rise in independence and strengthening transparency. Additionally, the latter has especially increased in developed countries alongside independence in emerging market countries (Dincer and Eichengreen (2014)).

Nevertheless, uneven progress in the achievement of price and financial stability, coupled with the existence of significant asymmetries not only in the formal status of central banks, as in the political and institutional imprints of actual positioning of monetary policy in coordinates of macroeconomic choice, intensified research that can be characterized as the second generation. A common feature of investigations of this type is a search for drivers of change in the level of CBI and their institutional content. This approach is worth considering as extremely fruitful, because it falls outside the framework of the conventional contrast of the proximity of the relationship of the independence index and inflation in terms of developed countries and the rest of the world.

Consequently, in a series of investigations, a significant progress in the increase of independence and transparency level of monetary authorities and the preservation of an inverse relationship between appropriate indices and the inflation level is confirmed. Thus, a combination of indices and a comparison of their representativeness are followed by a search for new factors to fill in CBI with a particular sense. For example, the GMT-index appears simplified (although it remains universal, it is computed for the largest number of central banks (Arnone et al. (2007)) compared to the extended CWN-index (Cukermann, Webb, Neyapti), or compared to the index of Dincer and Eichengreen (2014), who rely upon a more radical approach to understanding which factors make a central bank more independent in political, economic, and financial spheres.

As for drivers increasing the independence level of monetary authorities, there is no established position. For instance, proceeding from the CWN-index value for 99 countries, Crowe and Meade (2008) conclude that the rise monetary authorities’

independence inversely corresponds to the level already reached (i.e. the higher is initial level, the smaller its future increment), but corresponds positively with the currency exchange rate regime (a choice in favor of a fixed currency exchange rate stimulates choosing a more independent central bank, because it helps to restrict political pressure on monetary decisions inconsistent with target level of the exchange rate) and the democracy level (democratic societies tend to build more transparent institutions and the level of the latter correlates to the level of monetary autonomy and also in such societies there is a high tolerance level to a system of checks and balances). In its turn, a rise in independence positively affects the quality of state institutions, exchange rate flexibility, and transparency. The first is very important, because a more independent central bank prevents mild budget restrictions and pushes a choice in favor of higher quality institutions, otherwise the economy would be at risk of permanent instability and capital outflow. Dincer and Eichengreen (2014), using 89 central banks as an example, chose independent variables affecting the dependent variable – central bank independence index (CWI-index and the authors' own index), past inflation, transparency level, financial depth, GDP per capita, sizes of indebtedness from IMF funds, and the quality of institutions (a set of variables following World Bank Government Efficiency Indicators). They concluded that past inflation, cooperation with the IMF, and less developed financial markets have the largest influence on the rise of monetary autonomy in countries with medium and low incomes. Thus, the transparency level and past inflation are the most significant factors influencing independence in the whole selection. Additionally, they confirm that the level of the latter traditionally corresponds inversely to the inflation level and its variability.

Romelli's (2015) attitude to drivers of strengthening of monetary autonomy is more skeptical. He offers a dynamic index of CBI for 50 countries for the period from 1972 – 2014, due to which he shows that the rise of CBI is more probable where "external pressure" has taken place: cooperation with IMF or demands of membership in a currency union. Koziuk (2005, 2009) demonstrates that benefits of membership in an integrated union may destroy a coalition resisting the strengthening of monetary autonomy, as a result of which formation of currency unions is a powerful driver of the latter. In other words, macroeconomic and institutional benefits from a rise in CBI are not always obvious in countries where sufficient public pressure for reforms falls short due to the complicated system of hidden benefits from monetary policy manipulation.

Berggren et al (2011) pays attention to the connection between increased independence of monetary authorities and social trust. Using neo-institutional approaches to explain social conflicts and expenditures for negotiations, they confirm that structural reforms of monetary policy are not realized exceptionally in the need for them. They are the consequence of consent for their realization and how social trust among participants of political markets allows changes in essence without the review of legislation, which could be regarded as transformation of central banks on a formal level. As the level of social trust is an attributive characteristic of the type of society, it is not necessary to expect that the status of the central bank should be homogeneous in societies of different types. This conclusion is of large importance for analysis of commodity economies, in which possibilities for rent-seeking cause the appearance of a potential level of opposition among social actors that is inconsistent with the trust among them. On the other hand, a similar conclusion allows for understanding why particular central banks are more successful in price stability support even with a lower independence level compared to those having larger autonomy.

Building on the topic of institutional differences between countries, Bodea and Hicks (2012) point to necessity to explain less successful experiences of struggles with inflation in developing countries, not so much by problems related to the nature of estimating the level of independence (calculation methods and structures of indices are often criticized), but by the actual actions of monetary authorities. Their investigation covered 81 countries since 1973. Differences in the growth rate of the M2 aggregate were analyzed in light of the effects of discipline (less money minting even with such possibilities available), trust (public expectations for successful operation of central bank), and with different types of rulership. In democratic regimes, a more conservative central bank is more likely to exist (it is expressed through a lower volume of the money supply's growth rate) due to a system of checks and balances and the possibility to freely criticize the ruling government. At the same time, except for effect of discipline, the central bank, trust to which is provided by configuration of democratic political institutions, will tend to create pre-conditions for stable money demand, lowering inflation expectations.

Nevertheless, Bodea and Hicks (2012) offer more optimistic view on the role of democracy in the provision of CBI that theoretically does not always harmonize with analogous analysis of fiscal policy, in which government fragmentation, polarization of budget coalition participants' interests, attempts "to restrict the successor," etc., significantly deviate the budget deficit from the optimal one. In extrapolating the status of monetary authorities, it is obvious in light of opposite conclusions in the series of empirical investigations.

For instance, Lucotte (2009) concludes that the level of CBI increase in countries with average and low incomes for the period of 1995-2004 has significantly promoted the strengthening of fiscal discipline effect, because governments have lost an easy access to seigniorage. Consequently, the status of monetary authorities has a positive influence on fiscal policy design. Contrary to this conclusion, Heimonen and Maslowska-Jokinen (2014) assert that positive results of increased CBI in the budget deficit sphere are not perceptible. Contrarily, if the fundamental precondition of the budget deficit – low-quality institutions –

has not been settled, reinforcement of the autonomous status of the central bank causes growth of the national debt. The same refers to the private sector. Extending possibilities to take loans, for instance, owing to the positive effect of monetary discipline (CBI reduces inflation followed by a fall in interest rates) results in the rise of the level of indebtedness in the spheres where appropriate institutional preconditions for more restrained economic behavior are missing, which is proven by data from 14 EU member countries. Consequently, one may state that the nature of institutional configuration of a particular society can assimilate the CBI principle rather divergently. On the other hand, emphasis on the institutional differences of commodity economies requires appropriate analysis on the example of central banks.

## 2. Monetary autonomy in commodity countries

Although the majority of research on macropolitical specificity in commodity economies is not dedicated to the status of central bank, consideration of such specificity is important. It will assist in understanding the logical formulation of macropolitical priorities as a precondition of socio-political motivation for a level of independence for monetary authorities. As commodity wealth provokes a large variety of “redistribution temptations,” traditional analysis of macroregulators in commodity economies is concentrated upon fiscal policy (for instance, Aliyev (2013)). However, the realization of monetary policy in commodity-exporting countries is subject to a “specialized” analytical view, which in Frankel’s (2010) opinion, is conditioned by the problem of procyclicality. Conventional targeting of inflation or different kinds of currency exchange rate fixation can’t neutralize the aspect of the procyclicality of commodity economies, which is structurally specified by large shocks caused by terms of trade and reverses in capital flows. Frankel et al (2008) and Frankel (2010) offer shift the focus on targeting manufacturers’ prices, but not CPI. Also, these investigations of monetary policy are not dedicated to the role of the status of the central bank. The question of a correlation method for CBI and targeting manufacturers’ prices is not raised, as it requires a skeptical attitude under the effect of price stability as the purpose of policy and mandate being critical in formulation and provision of monetary authorities.

Ignoring the issue of CBI when considering an optimal monetary regime for commodity economies looks like a way to ignore the fact that the objective macropolitical function in such countries may vary as follows: developmentalism and an activist structure may be combined with welfare redistribution among separate groups. The currency exchange rate has a specific position in this context. On one hand, lively discussions on the problem of the relationship between real appreciation and the “resource curse” and the exchange rate as a welfare redistribution tool are held around selection of optimal regime of the currency exchange rate for resource-rich countries. The influence of the currency exchange rate regime on selection of a status for the central bank in resource-rich countries is not being discussed.

This problem can be regarded from two sides. A more independent central bank focuses on achievement of price stability, due to which a more flexible exchange rate is provided. Regime dependent central banks support fixed exchange rates and monetary autonomy is required to mitigate pressure on policies inconsistent with a fixed exchange rate regime. In the case of commodity economies, investigators mostly pay attention to the selection of the currency exchange rate regime, within which framing the status of the central bank is one of the explanatory variables. Empirical investigations prove that the more a particular country depends on resource exports, the more probable its government will choose a fixed rate. However, there are some differences. Aliyev (2014) confirms this on the basis of 145 countries from 1975-2004. The researcher simultaneously underlines that the larger the number of high-quality institutions, the more independent the central bank, and the less procyclical fiscal policy are in a country, the more probable its government will choose a more flexible exchange rate regime. In this research, special attention is paid to the important role of CBI as a precondition for choosing a more flexible exchange rate, corresponding to previous investigations on the positive relationship between the quality of national institutions and a selection in favor of larger monetary autonomy. But this investigation does not contain information about the relationship between commodity wealth and a selection in favor of the status of the central bank either in the context of choosing an exchange rate regime or otherwise.

In contradiction to this opinion, Wills and van der Ploeg (2014) state that accumulation of reserves is the simplest method of creating a quasi-sovereign wealth fund that additionally guarantees support of the fixed exchange rate, without which this fund could have been liquidated. If the central bank delegates creation of such a fund and its protection through a fixed rate, in which a method of macroeconomic stability support is focused, this is the consequence of understanding the risk that if this fund had been established by the government, it could have become the target of a raider attack or could have been spent by a clan-political group. Often it is impossible to create such a fund at all because of political corruption, which spends excessive costs using formal democratic institutions, provided that it does not matter whether they are current or investment ones. Wills and van der Ploeg (2014) do not argue over the relationship between commodity wealth and the sta-

tus of the central bank, but demonstrate the problems with creation of sovereign wealth in Nigeria, its spending in Ghana, and raiding in Nauru. Thus, in this context a central bank should be less independent to protect a fixed rate through formation of a sovereign wealth fund that goes outside the standard theory to the contrary of Aliyev's results (2014) is more in accordance with the traditional view of the problem. This more traditional vision was formulated by Obstfeld (2000) on the basis of discussions after the Asian crisis: macroeconomic stability is better achieved due to CBI than due to a fixed exchange rate. But it does not disprove the hypothesis that specific institutional framework conditions in resource-rich countries and the specific targets of macropolicy in them do not include a political choice in favor of a less independent central bank. Therefore, such a choice should not be based upon the currency exchange rate regime or level of national indebtedness (which are often considered in analysis of delegation of one or another level of autonomy by central banks in emerging market countries), if it is conditioned by deeper institutional factors.

## C. Opting for less independent central banks in commodity economies: theoretical reasoning and tendencies for reform of monetary authorities

### 1. Political economy of the functional choice concerning more dependent central banks

Explaining a lower level of monetary authorities' independence in resource-rich countries requires further consideration of the range of issues that are discussed in the theoretical analysis of the problem. Methodologically, they have to rely on peculiarities of the institutional structure of commodity exporters and specific monetary problems, namely the choice of an exchange rate regime, the management of currency reserves, etc. Corden (1982) is one of the first who shows that: both a floating exchange rate and actual appreciation of a fixed exchange rate pose a threat to suppression of industrial exports ("Dutch disease"). The objective function of the central bank in commodity economies should be adjusted for structural priorities. Due to the fact that a fixed exchange rate combined with optimal intertemporal policy allows reducing the variation in GDP and inflation, exchange reserves and fiscal buffers (which later turned into sovereign wealth funds) begin to be treated as a part of the policy of "foreseeing savings." Also, it is necessary to take into account that overcoming resource dependency requires a special structural policy that may allow the existence of a more controlled central bank, whose monetary choices would comply with a long-term strategy of the government concerning prioritizing variations of inflation or the exchange rate. For example, Hausmann and Rigobon (2002) state that the interventionist structural policy in trade and finance better corresponds to the logic of the fight against the "resource curse" than a policy based solely on compliance with intertemporal savings and the rise of allocational efficiency in financial markets.

The other side of the problem is the institutional deformity of "rent-seeking." In most cases, it is stated that they cause procyclicality of the fiscal policy (Aliyev, 2012). However, under the procyclicality of the fiscal policy in resource-rich countries lies a so-called "predatory government," "voracity effect," or open social conflicts related to control over resources and a lack of guarantees for ownerships (Auty, 2001; Arezki and Bruckner, 2010). Hence, the issue of transitory or persistence of a price shock in the commodity market, which is important for optimal policy of intertemporal savings, is ignored in the environment of weak institutions. Moreover, the transition from variable positive shocks to a steadily rising price trend only escalates the struggle for resources and exacerbates the problem of wasteful consumption.

Without going into a discussion about the optimal policy for a commodities-dependent economy, it should be noted that, within the analytical framework of the number of macroeconomic and institutional effects (which are shown in Table 1) of commodities exporters, one can see the explanation as to why the central bank appears to be less independent than in other cases. In this context, in this manner assumptions are made about whether this institutional design of the monetary policy is more or less optimal. Table 1 generalizes a set of macroeconomic and institutional effects and peculiarities of commodity economies, in terms of which the role of a less independent central bank is analytically outlined.

**Table 1. Structural peculiarities of commodity economies and central banks independence: positive analysis**

<i>Commodity economies: effects and peculiarities</i>	<i>Choice in favor of lower CBI</i>	<i>Potential optimality</i>
Political and economic costly tax collection and debt financing; Is the result of institutional weaknesses of the government in the fiscal sphere	Foreseeing increases of currency reserves guarantees independent financial solvency and can reduce the cost of external borrowing; Forcing the central bank is associated with keeping the rate up and accumulation of large reserves	The choice in favor of lower independence is not optimal because it does not solve the fundamental problem of the weakness of fiscal institutions
Political and economic costly tax collection and seigniorage is the result of institutional fragmentation that prevents even distribution of the tax burden, or when the taxable commodity sector is "privatized" by influence groups	The macroeconomic instability of a fragmented government limits its ability to implement external borrowing due to political risks, which make foreseeing increases in reserves hardly probable, and instead of this they encourage seigniorage; Fiscal dominance is prevalent; When the central bank is a tool to "limit the next government" because of inflation and financial instability, none of the groups is interested in increasing its independence. The same applies to access to seigniorage	The same as above
"Resource curse" and prevention from the "Dutch disease." The inflow of large amounts of FX increases the real exchange rate, which replaces the non-commodity sector and encourages the development of a domestic services sector with a high marginal propensity to consume; Structural policy is based on the elimination of preconditions of real revaluation of the rate and allows direct support to non-commodity sectors	Structural limitations for real revaluation may require an appropriate institutional decision concerning the central bank, especially when capital inflow is powerful and persistent and, due to this, domestic price stability may be doubtful; The dominance of the central bank concerning the priority of exchange rate stability, but not price stability, is accompanied by fiscal dominance in accordance with the priorities of industrial policy	Pressure on the priority of exchange rate stability over price stability does not always guarantee salvation from the problem of "Dutch disease" without additional measures being taken in the sphere of fiscal policy and regulation of wages; This choice has a fair optimality only when combined with the liability of the government for non-inflationary expense policies; The participation of the central bank in the active industrial policy is not optimal because it destroys incentives to develop non-commodity exports through the effects of inflation and weakening of sensitivity to competition
Currency reserves serve as a quasi- sovereign wealth fund; Increases in these reserves requires an appropriate exchange rate policy, and management of such a fund may require special financial control	Pressure on the central bank may address the issue prioritizing the exchange rate, which would be consistent with the maximization of foreign assets in the long run. Also, there is the problem of control of financial and investment risks of external assets management. CBI may complicate the control over quality aspects of external assets management since management objectives may not always be based on economic criteria	This situation shows the problems of institutional design of the control over external assets management; It can also be a sign of political failure to divide foreign assets into monetary (currency reserves) and sovereign (sovereign wealth fund), as a result of which a lower CBI may be justified only by problems related to effective control

<p>"Predatory government" and increase ("defense") of reserves; The government which maximizes the use of limited political and economic group faces a problem of access to external markets of borrowings. The necessary increase in reserves that is needed for this purpose can be considered as a macroeconomical step towards a creation of a monetary basis for the fiscal expansion. Although, this is a situation that is peculiar to countries with weak institutions in general, a commodity economies may be characterized by a combination of excessive costs with the reduction of external revenues, or expectations of such reduction</p>	<p>Pressure on the central bank may lie in creation of monetary conditions for accumulation of reserves that are not socially optimal. The increase in reserves intended for consumption by one group takes place at the cost of a reduction in consumption by the rest of the society; Retention of the rate from the equilibrium movement towards PPP is one of the examples of this; Similarly, a more rigid internal monetary policy may reflect circumstances of "reserves protection," when the main negative factor on the balance of payments is a "privatized" fiscal policy</p>	<p>The combination of an excessively rigid monetary policy and obviously expansionary fiscal policy would not be evidence of the optimality of a more dependent central bank; Such a mixed policy may be implemented during a relatively indefinite period of time, the duration of which is affected by factors of the external market environment or factors of internal political stability; The lack of CBI, which leads to an imbalance of the structure of aggregate expenditures, ends with a crisis</p>
<p>"Predatory government" and reduction of reserves; The maximization of consumption by one political and economic group takes place due to the support of a fixed exchange rate in the conditions of the expected reduction in revenues; Also, the reduction in reserves is a way to limit future governments or a means to extend the "expropriation" of value for the foreign assets already accumulated</p>	<p>A dependent central bank prefers the support of a non-equilibrium rate to the deterioration in balance of payments, which makes its reserves decrease and imbalances grow; A reduction in reserves may also occur through direct or indirect access to the limited supply of currency by specific members of the ruling group; Monetary policy becomes a redistributive tool that rationalizes access to FX in favor of particular persons</p>	<p>The support of the non-equilibrium rate and loss in reserves from the point of view of redistributive considerations may not be evidence of the optimal choice in favor of a dependent central bank</p>
<p>"Voracity effect" is a radical case of the "predatory government" which increases expenditures faster than world prices rise and the conditions of trade improve; It takes place in conditions of expected and persistent increases in prices for commodities, during which the expropriation of value progresses on a scale that results in the loss of motivation for economic activity by agents outside the ruling group; Expansion of expenditures reduces reserves and increases external debt</p>	<p>Under the "voracity effect," monetary preconditions of intertemporal savings are removed institutionally, and due to this fact the expectations of stable and growing external revenues are accompanied by the accumulation of net external liabilities and deceleration of economic activity; Pressure on the central bank occurs in the directions of the elimination of reserve accumulation, support of a non-equilibrium rate, enabling the export of capital, and impeding access of other economic agents to FX</p>	<p>This is the most blatant instance of a non-optimal institutional design for macroeconomic policy. The lack of CBI is not only a counter-weight to fiscal expansion, but it is also a monetary continuation with explicit redistributive focus ending in procyclicality that borders with a permanent crisis</p>
<p>Foreign exchange and rate estimation of rent; The estimation of rent in foreign currency and the source of its formation may have influence on the choice of exchange rate policies with corresponding consequences for the money supply and reserves. When the main source of rent is foreign revenues, then the interest in choosing the rate (or in a broader sense in choosing the instrument of economic policy) grows, this stimulates exporters regardless of the general equilibrium of economics; When the main source of rent is internal expropriation, the support of a stable exchange rate may reflect efforts to increase the cost of domestic revenues in foreign currency, encouraging the expansion of opportunities for exporting capital</p>	<p>The central bank becomes an institutional form for redistributive use of the exchange rate and capital flows regulation; Supporting exporters does not always guarantee an increase in reserves through export of the capital; Second, the export of capital becomes an external continuation of the internal expropriation (raid) and the dependent central bank is required to allow access to FX and to bypass formal restrictions on the movement of capital</p>	<p>Such a choice is not optimal, as it involves the redistributive nature of foreign exchange rate policy, and decision on regulation and supervision of capital flows turn into an instance of a "privatized" institute</p>

Note 1. Drawn up by the author.



At the same time, the peculiarities of commodity economies in terms of the functional approach to CBI allow a potential optimality of a lower level of monetary autonomy, but they do not determine it unconditionally. This means that there may be circumstances in which the wealth of resources is considered as a source of a "resource curse" threat. In other words there may be a socio-political acknowledged fact (regardless of the political regime) for the necessity to combat resource dependence. Preventing the "resource curse" may become a public choice and not be the subject of a social compromise or grounds for opportunistic behavior. In such cases, a more dependent central bank is not a definite optimal choice, as traditional monetary autonomy does not exclude a better macroeconomic result and does not contradict the possibilities of implementing structural policies for diversification and intertemporal smoothing. Past inflation experience as a determinant for reforming the status of the central bank may also be independent from the level of resource wealth, but when the latter became the reason for a policy that ended in the acceleration of inflation (e.g., Venezuela), the choice in favor of a higher level of CBI may be considered in the traditional macroeconomic context and not in the light of overcoming resource curse limitations.

## 2. The ruling trend of reforms of central banks

In light of the fact that the status of the central bank is not an institutional invariant both in terms of lower and higher CBI, the problem of reforms in monetary authorities remains a relevant comparative backdrop in the case analysis of resource exporters. The issue of such reforms is even more vital if we take into account at least two trends.

First, fluctuations in prices and capital flows become increasingly synchronized with the phases of global liquidity behavior, resulting in major changes in the inflow and outflow of foreign exchange cover of more sectors of the economy and finance. Now the problem of procyclicality of commodity economies mostly concerns financial stability and financial imbalances. Namely synchronization of the movement of world prices for resources and assets with the vector of capital movement is not just deepening the conflict in terms of the stability of prices and exchange rate, but adds a financial dimension to it: a series of external borrowings of the private sector, a disproportion of foreign currency assets structure and liabilities in the real and financial sectors, an increase of external assets alongside a worsening of the balance of payments, a real estate bubble, excessive household sector leverage, etc.

Second, due to social capitalization of the resource wealth, a trend to deepen the internal market is being formed. As a result, a range of influences on inflation is expanded and the behavior of the aggregate demand in certain periods of the cycle of global prices for commodities deviates from the tough conditionality of the world market. Thus, a more traditional relationship between price stability and aggregate demand is activated, and, due to this, structural changes activate the preconditions for a more representative modality of links between macroeconomic processes and the institutional format of the monetary policy. Integration between CBI and inflation becomes particularly important where marginal cases of resource wealth are not observed, and in these cases the extent of fluctuations of global liquidity will potentially demand institutional adaptation, signs of which will be formed by a trend of structural reforms in the monetary policy for the last period.

The reforms of central banks clearly indicate that the increase of political and economic independence is an unambiguous fact, which finds its confirmation in the change of value of the relevant indices. As such, Arnone et al (2007) confirm that the increase of both political and economic independence of monetary authorities goes in the same direction, although with certain peculiarities for different world regions and groups of countries. In particular, visible progress in improving economic independence is indicative for countries with emerging markets and developing countries (see Table 2).

**Table 2. Regional trends of increasing CBI. GMT-index for 163 countries**

	<i>Political</i>		<i>Economic</i>		<i>Total</i>	
	<i>1980s</i>	<i>2000s</i>	<i>1980s</i>	<i>2000s</i>	<i>1980s</i>	<i>2000s</i>
<i>Africa</i>	0.17	0.37	0.52	0.72	0.33	0.53
<i>Asia and Oceania</i>	0.21	0.54	0.41	0.73	0.30	0.63
<i>Europe</i>	0.32	0.79	0.27	0.98	0.30	0.88
<i>Middle East</i>	0.25	0.40	0.36	0.68	0.30	0.53
<i>Latin America</i>	0.36	0.50	0.36	0.88	0.36	0.067
<i>In total</i>	0.28	0.56	0.38	0.84	0.32	0.68

Source: Arnonen et al. (2007).

Application of a gradual, non-formal (index growth) approach to the evaluation of trends in the sphere of CBI also reflects its significant strengthening as a result of implementing corresponding reforms. Remarkably, the distribution of reforms overtime is tightly correlated enough with periods after crises. On the basis of the data provided by Romelli (2015), peculiar "storms" of reforms since 1972 may be observed. The reforms of the late 1970s-1980s are definitely related to the effects of high inflation in developed countries. The reforms of the early 1990s are related to the process of European integration. From 1997 to 2002, a modernization of central banks in countries with emerging markets was the response to the Asian crisis and the search for institutional alternatives to inflexible rates. Since 2007, one may observe a continuation of institutional adaption to post-crisis instability, when the independence of monetary authorities continues to be considered as an important element of adaptation to a new macro-financial environment. In the words of CBI indices, reforms also confirm the unambiguity of the trend concerning strengthening of the institutional protection of monetary authorities (Table 3). It is important to emphasize that a starting level of the average, minimum, and maximum values of the relevant indices for the corresponding group of countries increase with each subsequent period.

**Table 3. Indices of CBI in terms of periods and number of reforms**

Years		1972-1979	1980-1989	1990-1999	2000-2009	2010-2014
<b>Number of countries</b>		<b>28</b>	<b>30</b>	<b>49</b>	<b>50</b>	<b>50</b>
<b>ECBI</b>	<b>Number of reforms</b>	8 (3; 5)	9 (2; 7)	42 (3; 39)	31 (2; 29)	11 (5; 6)
	<b>Average Value</b>	0.490	0.503	0.594	0.755	0.777
	<b>Minimum</b>	0.201	0.206	0.206	0.387	0.399
	<b>Maximum</b>	0.783	0.783	0.963	0.963	0.963
<b>GMT</b>	<b>Number of reforms</b>	6 (3; 3)	6 (2; 4)	37 (3; 34)	26 (2; 24)	8 (4; 4)
	<b>Average Value</b>	0.401	0.411	0.528	0.720	0.744
	<b>Minimum</b>	0.063	0.063	0.063	0.125	0.125
	<b>Maximum</b>	0.750	0.750	1	1	1
<b>CWN</b>	<b>Number of reforms</b>	8 (2; 6)	7 (0; 7)	37 (2; 35)	24 (1; 23)	5 (0; 5)
	<b>Average Value</b>	0.390	0.412	0.533	0.746	0.774
	<b>Minimum</b>	0.090	0.135	0.135	0.193	0.193
	<b>Maximum</b>	0.735	0.799	0.979	0.979	0.979

*Note 1.* ECBI stands for Romelli's dynamic CBI index. GMT stands for the index by Grilli, Masciandaro, and Tabellini. CWN stands for the index by Cukierman, Webb, Neyapti.

*Note 2.* Explanation to the column "Number of reforms": total number of reforms (number of reforms that reduce the index value).

Source: Romelli (2015).

The most significant in this regard is the period of the 1990s. During this period, the most considerable increase of CBI took place and the empirical basis for "best practices" that later gained wide recognition were formed. A slightly slower rise of the independence level at a later stage gives evidence of a relatively high level already achieved that is also noted by other authors (see Dincer and Eichengreen (2014)), but this does not rule out that the ongoing monetary reforms have another quality – they are more focused on the "nuances" of institutional relationships with the branches of government, the appointment system, and the political responsibility of leadership. As a matter of fact, these are the components of independence that may be easily frustrated within the framework of political resistance to the declaration of its principle as a fundamental institutional practice, which is peculiar for countries with weak institutes. If the principal assumes a deviation from the socially optimal rate of inflation or obtains hidden (or obvious) benefits from quasi-fiscal operations, or if he is directly involved in fiscal dominance, then an agent, whatever status he has, has little chances for behavior that differs from the principal's. It is no coincidence that the quality of institutes was especially moved out to the fore when the drivers of the increase of the level of CBI were determined in studies of the second generation (Crowe and Meade, 2008; Dincer and Eichengreen, 2014).

As for a certain increase in the number of reforms during 2010-2014, as a result of which the index of independence goes down (see Table 3), they should not be connected with the direct rethinking of the paradigm of the autonomy of monetary authorities after the global financial crisis, discussions of which have taken place (Koziuk, 2015), but with the transformation of functions and responsibilities of central banks in banking supervision. Differences in the structure of indices listed in Table 3 clearly show this. The CWN-index is more complex and sophisticated, and it includes a wider range of items of monetary autonomy compared to the GMT-index. But the latter is more sensitive to powers in the sphere of banking supervision (according to the GMT approach: the greater the responsibility entrusted to the central bank in this sphere, the less independent it is). A similar situation occurs with the ECBI-index. Changes in financial regulation and strengthening of monetary responsibility for financial stability took place in some countries, a perfect example of which is the Bank of England. Accordingly, the increased number of reforms that reduce CBI is a matter of banking supervision, which captures the GMT-index and ignores the CWN-index rather than a matter of institutional principles of the monetary policy.

## D. Resources export and CBI

### 1. Commodities export and independence of monetary authorities: a comparative analysis in terms of groups of countries

For checking the hypothesis a lower level of CBI in commodity economies, it a group comparison was held of an extended CWN-index magnitude, GMT-index, and central bank transparency index in the context of developed countries (the first group), countries with emerging markets, developing countries (the second group) and resource-rich countries (the third group). As mentioned above, the first two indices differ on a compositional level. They are counted up for the different periods of time and cover a different number of countries, which in some cases mismatch. On one hand, the same groups that are evaluated on the basis of the average values of different indices, having a slightly different composition, cannot be compared directly. On the other hand, the differentiation of the groups' compositions in the context of available index values allows testing of the commonality of trends in cases when the indices' average group values have identical patterns. In other words, the distinctive content of groups and the indices' composition can be used as independent confirmation of the hypothesis and mutual reinforcement of arguments based on a separate analysis in the context of different indexes.

The theoretical hypothesis is the following: if the resource factor really makes an impact on the choice of the level of CBI, the average value of the applicable index of the third group of countries should be lower than the first two. It is especially important that the average value of the third group is lower than in the second, represented by countries with low and medium incomes, similar to most commodities for a wide range of institutional and structural indicators and which account the largest number of central banks' reforms in the recent past. The results in the Tables 4-6 fully confirm to the suggested hypothesis

**Table 4. GMT-index in the context of groups of countries**

	1980s	2000
<i>Developed countries</i>	0.48 (18 countries)	0.75 (27 countries)
<i>Countries with emerging markets and developing countries</i>	0.34 (57 countries)	0.24 (135 countries)
<i>Commodities exporting countries</i>	0.34 (17 countries)	0.55 (44 countries)
<i>Commodities "extra exporting countries", a share of commodities export is more than the median value in 65%</i>	0.27 (9 countries)	0.49 (28 countries)
<i>Energy resources "extra exporting countries", the share of commodities export is more than the median value in 35%</i>	0.24 (3 countries)	0.47 (22 countries)
<i>Metals "extra exporting countries", the share of commodities export is more than the median value in 12%</i>	0.27 (4 countries)	0.62 (11 countries)
<i>Food resources "extra exporting countries", the share of commodities export is more than the median value in 15%</i>	0.40 (9 countries)	0.59 (15 countries)

*Note 1.* Arranged into groups by the author on the basis of a commodities-exporting countries list and the empirical bases of the IMF's "extra-exporters" definition (2015). The GMT-index is contained in the Arnone et al (2007).

Thus, the data in Table 4 allows emphasizing a few important points. First, the level of CBI in the world has advanced unambiguously. Herewith the resource-rich countries are not an exception. On average, they tend towards the similar substantial increase of the corresponding assessing index value as for the second group of countries. In other words, the general trend of increasing monetary autonomy described above concerns the analyzed countries too. Second, the third group's independence level proved to be lower than the second group and significantly lower than the first, confirming the suggested hypothesis. Third, the formation of resource wealth has a significance. In energy resources exporting countries, the average value of the GMT-index turned out to be the lowest in the context of all these groups, meanwhile, in metals and food exporters, this value is sometimes higher than in the second group. Fourth, the increase of the GMT-index for the respective years in metals exporters is the highest, and in food exporters it has grown from the highest starting position. Fifth, it can be assumed that the formation of resources wealth has significant consequences. The rent value being derived from the resource type, in which the country is rich impacts the way in which the fight for access resources is institutionalized with the respective consequences for the monetary authorities' independence.

Table 5 illustrates the changes of an extended CWN-index from the end of the 1990s. The specificity is that, according to this index, the level of CBI in developed countries was lower than in other countries of the world. It can be explained by later reforms based on best practices. In addition, the group of developed countries is not made up of the EMU member countries which are presented in the ECB, whereas in Table 4 there is the country's representation of the GMT-index. Grouping in the context of "extra-exporters" was not conducted due to limited data. As for the suggested hypothesis about the lowest level of CBI in resource-rich countries, it has found confirmation here. The value of the corresponding index for the third group is lower than for the second one. Also, the value of this index for the second group has increased more significantly than for the third.

**Table 5. Extended CWN-index in the context of groups of countries**

	1998	2004	2010
<i>Developed countries (12 countries + ECB)</i>	0.32	0.39	0.35
<i>Countries with emerging markets and developing countries (74 countries)</i>	0.47	0.53	0.54
<i>Commodities exporting countries (22 countries)</i>	0.43	0.47	0.47

*Note 1.* Arranged into groups by the author on the basis of the IMF's commodities exporting countries list (2015). The extended CWN-index is contained in Dincer and Eichengreen (2014).

Table 6 shows the index change in transparency of central banks. Unlike the data of Table 5, the result is much closer to the case of the GMT-index. The transparency level of monetary authorities in developed countries is distinctively higher than in the rest of the world. For developed countries, the achievement of monetary efficiency occurs not only through formal independence, but also by increasing transparency. Central banks of resource-rich countries turned out to be the most opaque.

**Table 6. Transparency index in the context of groups of countries**

	1998	2004	2010
<i>Developed countries (18 countries + ECB)</i>	6.78	9.13	10.53
<i>Countries with emerging markets and developing countries (100 countries)</i>	2.63	4.03	5.0
<i>Commodities exporting countries (35 countries)</i>	2.35	3.55	4.32

*Note 1.* Arranged into groups by the author on the basis of IMF's commodities exporting countries list (2015). The Transparency index is contained in Dincer and Eichengreen (2014). The maximum index value of transparency is 15.

The lowest level of transparency of commodities-exporters' central banks can be considered in the context of the overall lower level of CBI. This is the situation when low CBI and transparency reinforce each other, confirming the suggested hypothesis and represents itself in the reflection of institutional choice. It is possible to consider this problem also from the perspective of other structural characteristics of commodity economies. For example, taking into account the discovery in Dincer and Eichengreen (2014) stipulating an increase in transparency through the level of development and the depth of financial markets, the low openness and transparency of central banks in the third group of countries should not cause surprise if we take into account the results of Kurronen's investigation (2012). The low level of interior financial sector development in the group of countries analyzed can be qualified as one that reduces political and economic demand on central bank transparency, which has resulted in the value of the respective index. On the other hand, according to Wills and van der Ploeg (2014), the currency reserves in commodities exporting countries are a quasi-sovereign wealth fund, of which transparent management remains low. However, the low transparency of external assets management is the most probable for autocratic regimes or in the condition of weak institutions. It means that the link between the political regimes and resources wealth should also be taken into account.

For additional testing of the hypothesis about the conditionality of the level of CBI by a commodities factor, the TOR-index was applied (TOR-index from English – turnover rate). According to Cukierman (1992) and Cukierman et al. (1992), it is intended to assess the correlation between the formal independence, which the index evaluates, and the actual one, which depends on how a central bank's management is over the whole statutorily-required period of engagement. The data in the Table 7 also does not contradict the given hypothesis.

**Table 7. TOR-index in the context of groups of countries**

	<i>Number of countries</i>	<i>Average index value</i>
<i>Developed countries</i>	26	0.16
<i>Countries with emerging markets and developing countries</i>	105	0.22
<i>Commodities exporting countries</i>	37	0.28

*Note 1.* Arranged into groups by the author on the basis of the IMF's commodities exporting countries list (2015). The index is calculated for 1970-2004. Dreher et al. (2007).

According to the data of Table 7, this index value is the highest only for resource-rich countries and the lowest for developed countries. However, the TOR-index is within the scope of critique. It will adequately describe the situation regarding the discrepancy between the formal and actual CBI only in the case when an appointed manager as the agent focuses on the lowest social optimal inflation level compared to the principal. In the categories of Rogoff (1985), this is a situation when the agent is more conservative than the principal, the consequence of which is that a more rigid monetary policy is not supported by the highest-level leaders by virtue of the electorate or other opportunistic considerations. In the case where the chief of the central bank does not meet the criterion of conservatism according to Rogoff (1985), the TOR-index value may not reflect a low level of actual independence: the principal is satisfied by a weak central bank chief without regard to the level of formal independence. In light of these considerations, the data presented in Table 7 requires cautious interpretation taking into account the resource-rich countries heterogeneity.

For example, according to Dreher et al. calculations (2007), the central bank chiefs of the Persian Gulf countries occupied their positions the most stably, the countries of Latin America and other developed countries that changed chiefs the most commonly, occurred where inflation struggles were unsatisfactory or conflicting and inconsistent. If we take into account the nature of the political regime, you should assume that in autocratic countries the TOR-index will be lower because of the agent is tightly controlled by the principal, whereas in democratic countries its low value will be the consequence of the fact that for the qualitative institutions, appointment and dismissal takes place on the basis of professional criteria. High values of the TOR-index will be in countries with weak institutions, primarily in commodity economies where the central bank is a tool or weapon for access to the rent of competing political and economic groups. In other words, the democracy level is sufficient for procedural possibilities of central bank managers' frequent changes, but the quality of democracy is low for appointing manager whose intentions in the field of monetary policy are not contrary to what policy that central bank would carry out with an appropriate independence level.

The relationship between the CBI, the exchange rate regime, and the level of democracy reflects another aspect of the problem. Table 8 shows the distribution of commodities exporting countries according to monetary regimes, the terms of which are calculated with average group values of the GMT-index and the democracy index.

Table 8. Monetary regimes in resource-rich countries

<i>Monetary regime</i>	<i>Peg to the US dollar</i>	<i>Peg different from US dollar</i>	<i>Money supply targeting</i>	<i>Inflation targeting</i>
<i>Countries</i>	Iraq, Angola, Guyana, Kazakhstan, Mongolia, Saudi Arabia, Bolivia, Mauritania, Timor-Leste, Surinam, Trinidad and Tobago, Turkmenistan, Venezuela, Vietnam, Yemen, Ecuador, Bahrain, Oman, the U.A.E., Qatar	Cameroon, Chad, Central African Republic, Republic of Congo, Equatorial Guinea, Gabon, Mali, Kuwait, Libya, Russia, Syria, Botswana, Iran, Azerbaijan, Algeria, Brunei	Guinea, Nigeria, Papua New Guinea, Sudan, Zambia	Indonesia, Peru, Chile, Mexico, Norway
<i>The number of countries</i>	20	16	5	5
<i>The commodity-rich countries share, %</i>	43	32	11	11
<i>The countries proportion, which have made a choice in favor of this monetary regime among all countries, %</i>	34	26	11	23
<i>Average GMT-index</i>	0.54	0.46	0.49	0.70
<i>Democracy index</i>	4.34	3.30	4.35	7.58

*Note:* the democracy index value, reflecting the autocratic regime, 0-4; hybrid regime, accordingly, 4.1-5.94; 6.03-7.94 – weak democracy; more than 8.03 - full democracy.

*Source:* the countries distribution according to the monetary regime criterion in accordance with Wills and van der Ploeg (2014). The GMT-index is contained in Arnone et al (2007). The democracy index according to the Economist Intelligence Unit.

Based on the data of Table 8, we can come to the following conclusions. First, for the countries with fixed exchange rates and money supply targets, the average level of CBI is even lower than in the group of commodities exporters in general from Table 4. The independence level of the monetary authorities for inflation targeting regimes is comparable with the average level of developed countries. It confirms Aliyev's research (2014). In other words, the hypothesis that a more independent central bank is required to protect a fixed rate is not confirmed by the example of commodity economies. A higher level of monetary autonomy inherent for inflation-targeting regimes is evidence of the institutional maturity of such countries. Second, the fact of institutional maturity of commodity economies in terms of the monetary regime choice and the level of CBI is confirmed by the nature of the political regime. The countries, presented in Table 8 with fixed rate or money supply targets are mostly autocratic. And only inflation-targeting regimes have the level of democracy inherent for many developed countries. Third, the transition to inflation targeting and choosing autonomy for the monetary authorities in general is a reflection of a democratic institution's role in the neutralization of monetary policy's functional usage in the process of commodities rent redistribution. Fourth, in the context of specific and autocratic aspects of rents redistribution, a fixed rate appears better-integrated into external wealth control mechanisms, which needs a less transparent central bank. It makes the data of Table 6 stand out. On the other hand, exchange rate stability could be considered as a component of autocracy's social contract with the society, where "stability" and prosperity (where it is based on the solvency ensured by the exchange rate stability) are the "loyalty retaliation" to the monopoly on the political power and resource rents.

## 2. Econometric evaluation of the relationship between monetary autonomy and commodity exports

A regression analysis was used for additional hypothesis verification of the relationship between commodities wealth and the level of CBI. Despite the fact that resources wealth is not always measured by the share of commodity exports, specifically the primary extraction commodity exports (cultivation) or commodities with low added value, is considered as the most representative structural sign of the respective countries.

There are several approaches to define the criteria to assign countries as commodities exporters. The simplest approach was used at Aliyev (2013), where a resource-rich country is recognized by a share of commodity exports that exceeds 50% of the total export structure. An analogous variable of resource wealth appears in other investigations (Aliyev, 2012; Aliyev, 2013). The IMF makes use of a somewhat different approach. A resource-rich country means a country where the commodity exports share from 1962-2014 on average did not descend below 35% of total exports and the net commodity exports for the same period of time exceeds 5% of the gross foreign trade (exports + imports) (IMF, 2015). For purposes of the countries list, these approaches are almost identical, but the latter is structurally stricter because it excludes those countries with significant intermediate consumption of commodities.

In empirical models, the commodities factor evaluation is often carried out as the example of a broad sample of countries without analytical groupings. It allows seeing the influence of the resources wealth variable that is mostly the commodity exports' share on the dependent variable in a wider range of structural characteristics. Similar work is research by Kurronen (2012) on the definition of features of commodity exports' impact on the financial sector structure (resources wealth inhibits banking sector development but encourages borrowing; the financial system market model is much more likely in commodity exporting countries; and the commodities sector does not require a significant internal financial sector, because it is based on eye-watering external borrowing to finance large-scale projects and the rent acts as the guarantee of solvency whereby the underdeveloped financial intermediation limits the access to finance in other sectors and aggravates the problem of the "resource curse"). In her regressive model, 133 countries were analyzed and the independent variable was the share of "mineral export," equivalent to the sum of the three positions of the World Development Indicators: the Structure of Merchandise Exports, namely: Agricultural Raw Materials + Fuels + Ores and Metals.

To determine the impact of the commodities factor on the level of CBI, a sample of 150 countries were tested using a multifactorial regression type:

$$Y = a + b1 \times \ln X1 + b2 \times \ln X2 + b3 \times X3, (1)$$

where:

Y – the GMT-index. As mentioned above, this index was calculated for the greatest number of countries (Arnone et al, 2007). It sufficiently representatively estimates the formal status of monetary authorities, even though inferior to the breadth of coverage options, the importance of which is registered in later investigations (Dincer and Eichengreen, 2014);

X1 – the inflation of previous period. The previous period inflation indicator's value in the literature has already noted its importance as a driver for strengthening of monetary autonomy in the sense that the more rigorous the inflationary experience of the country was, the more it is inclined to accept an anti-inflationary institute as the independent central bank. The indicator of the previous period inflation is the average value of CPI fluctuations for 1987-1996. On one hand, during this period the hyperinflation strip was over. On the other hand, it was the most large-scale period of reforming central banks in many countries of the world. The importance of this independent variable is substantiated by the fact that the inflation experience, regardless of resources wealth, can impact the performance of the GMT-index. At the same time, the usage of this variable allows for eliminating the risk of non-commodity exporters in terms of their monetary policy success in a wider sample of countries. A logarithm was used to neutralize the impact of significant variances in the light of the fact that many countries experienced hyperinflation during the selected period;

X2 – the commodity exports share of the World Development Indicators: the Structure of Merchandise Exports, which is calculated as the sum of the positions: Agricultural Raw Materials, Fuels, Ores and Metals. In the case of island countries, the position of Food is used because it is very difficult to separate food from the agricultural raw materials for agricultural production in a tropical zone. A logarithm was used to smooth large variances when one group contains countries with minimal resource wealth and maximum resource wealth;

X3 – Democracy Index (Economist Intelligence Unit). This indicator was chosen according to two reasons. First, as already mentioned, there is a convincing positive relationship between the level of democracy or the quality of the institutions that corresponds with the democracy level, and CBI. Second, as the literature demonstrates on the issues of political economy of resources wealth, the latter often assumes an opposite correlation with the level of democracy. Therefore, these are situations when an autocratic regime monopolizes the rent and eliminates competing political and economic groups, thereby avoiding the "predatory" attitude to resources, or redistributes rent for its own benefit within socially acceptable limits.

The inverse relationship between resources wealth and the level of democracy is connected for a number of reasons. On one hand, a dictatorial regime allows for eliminating the access to rent of competing political, economic, social, or ethnic groups, to monopolize it, to or redistribute according to the conventionally social preferences, which would correspond with maintaining loyalty to the regime. Thus, in the case of weak institutions, such a regime allows the restriction of a "predatory state" with the appropriate redistributive conflicts and macroeconomic instability, which is a struggle consequence for access to resources. Similar is the case of state fragmentation, when the lack of social trust between clearly established ethnic or political and economic groups leads to a situation of "predatory" exploitation of temporary access to resources connected with one of competing groups' electoral cycle. On the other hand, extending rent to allow for the installation of a dictatorial regime is a winning strategy for obtaining unilateral benefits that fully cover the expropriation costs and maintain control over society in the future. Third, the initial democratic regime in the conditions of a "resource curse" does not rule out that access to rent becomes the source of the "privatization" of political institutions. Therefore, democratic institutions deteriorate and are converted into substitute, concealed dividers of the consensus or into a source of social instability, economic populism, and macroeconomic vulnerability. In all three cases, the logic of tracing CBI by linking to quality of democracy and the quality of institutions must be discernible.

Most commodity economies research in this context is focused on fiscal policy, which is directly connected with resources income and rent redistribution (the review is presented by Aliyev (2013)), or on the exchange rates problem, whereas CBI is not directly analyzed. Table 8 confirms that rate fixation corresponds inversely with the level of CBI, and the political regime's role retains its relevance in this case, which allows for the inclusion of the optionality of the exchange rate regime variable into the model (1). The data in Table 8 allows us to discard the probability of bivariate connection between the degree of exchange rate flexibility and the level of monetary authorities' independence.

The result of the regressive analysis (Table 9) admits a small statistical significance of the resource factor, in the first approximation.

**Table 9. Result of the regressive analysis of the relationship between the level of CBI, past inflation, the share of commodity exports, and the political regime**

<i>Independent variables</i>	<i>GMT-index</i>	
	<i>b</i>	<i>t-statistics</i>
<i>Ln Past inflation</i>	0.037 (0.008)	4.3495
<i>Ln Share of commodity exports</i>	-0.003 (0.0128)	-0.2364
<i>Democracy Index</i>	0.051 (0.0071)	7.2975
<i>R</i>	0.585	
<i>R<sup>2</sup></i>	0.343	
<i>Adjusted R<sup>2</sup></i>	0.329	
<i>F</i>	(3.146) = 25.352	

*Note 1.* It is based on data from 150 countries using the STATISTICA software package.

Data given in Table 9 shows that the sign of the indices is theoretically predictable in all cases: past inflation, as well as a level of democracy positively affects the degree of the CBI. However, the level of democracy is the most significant factor with the most significant index. The variable of resources wealth is not found as dominant in the definition of the GMT-index. It is inferior to the democracy index (the highest coefficient) and the past inflation variable by a significant level.

Based on the results of the regressive analysis, it is possible to conclude a lack of substantial conditionality of CBI upon resources wealth within a broad sample of countries. However, it can also be concluded that such a relationship may be indirect, i.e., through the relationship between resources wealth and the political regime. That is, political and institutional characteristics of a country and inflationary experience are probably more important factors than resources wealth. But the latter makes



an impact on the independence level of monetary authorities through the inverse relationship between resources wealth and the level of democracy that has been verified in a series of other studies. This means that the independence level of monetary authorities is directly determined by past inflation and the level of democracy, while resources dependence acts rather indirectly, although clearly seen in the case of group comparisons (see above). A correlation matrix (Table 10) fully confirms the assumptions made.

**Table 10. Correlation matrix of relationships between the regressive model variables (1)**

	<i>Ln Past inflation</i>	<i>Ln Share of commodity exports</i>	<i>Democracy Index</i>	<i>GMT-index</i>
<i>Ln Historic inflation</i>	1.00	0.002529	-0.140396	0.219373
<i>Ln Share of commodity exports</i>	0.002529	1.00	-0.400290	-0.233033
<i>Democracy Index</i>	-0.140396	-0.400290	1.00	0.506168
<i>GMT-index</i>	0.219373	-0.233033	0.506168	1.00

*Note 1.* It is based on data from 150 countries using the STATISTICA software package.

As the data given in Table 10 shows, the independence index value correlates with the democracy index the most densely, and the latter is inversely correlated with the resources wealth variable. Past inflation is also directly correlated with the GMT-index, while there is virtually no relationship between resources wealth and the past inflation variable. This means that resource-rich countries could be substantially different in nature regarding inflation experiences, as well as countries in which such structural characteristics as export resource dominance is not significant. It is also important to note that the level of democracy corresponds inversely with the level of inflation in the past. This can be interpreted quite definitively: more democratic countries tend to support a lower inflation level, regardless of whether they are resource-rich or not. Simultaneously, the correlation matrix confirms that the impact of resources wealth on the level of CBI is likely mediated by a political regime, i.e., the tendency of resource exporters towards an autocratic regime, which does not always coexist with a high level of inflation. This is confirmed by the case of the Persian Gulf countries. Indirectly, the correlation matrix allows us to see that when resource wealth coexists with low levels of democracy and inflation, monopolization of access to rent is not so much expropriational as it is evidence of an institutional response to the removal of “predatory behavior”. In contrast, the combination of resource wealth with a low level of democracy and a high level of inflation indicates the presence of a fight for rents. In the first case, CBI cannot be regarded as desirable in the light of significant fiscal dominance focused on intertemporal optimization. And in the second case, it can be considered as an obstacle in the fight for rent. In the case of a higher level of democracy, the combination of resource wealth and a high inflation level may indicate that the competing political and economic and ethnic groups consider the central bank as a way to gain benefits within the electoral cycle.

### 3. Structural reforms in resource-rich countries and intermediate conclusions for Ukraine

The post-Asian cycle of growth in world commodity prices has placed a greater focus on structural reforms in resource-rich countries. Most of them deal with issues of fiscal policy, optimal intertemporal savings, creating sovereign wealth funds, and economic diversification. They have also touched upon reforming monetary authorities. First of all, they concerned the adaptation of the price stability policy to an environment of strong pressure on the nominal exchange rate and a growth in gross private capital flows. More generally, they evidenced that CBI helps solve the problem of resource dependency due to the fact that the fiscal policy becomes more responsible, and the basic principle of the political priority to prevent “resource curse” is observed at the institutional level. For example, Chile, Peru, Mexico, Algeria, Azerbaijan, Kazakhstan, etc., have been able to demonstrate weakening the seesaw effect, which means positive changes in one area, leading to deterioration in another because of a lack of interest in actual rather than virtual reforms. According to Acemoglu et al (2008), the “seesaw effect” provides for the following in the case of central banks: increasing CBI can improve the success of the fight against inflation, but may result in an increase in national debt, for instance, Acemoglu et al (2008) argue that this effect is most common in societies with either severe political constraints (autocratic regime) or with weak ones (irresponsible democracy). Due to their institutional specificity, commodity economies are at risk of both types of political constraints, which is indirectly confirmed by empirical relationship between the resource wealth variable and the political regime variable (see Tables 8-9). A solution to the problem is possible on the basis of an integrated upgrade of an institutional format for macroeconomic policy, within which a low level of CBI will not be considered by functionally opportunistic groups.

The issue of a relationship between the NBU's independence and institutional distortions of commodity economies is crucial for Ukraine. On one hand, the share of commodity exports (according to World Development Indicators) does not indicate that the domestic economy is a typical example of resource wealth. On the other hand, it demonstrated very high sensitivity to world commodity prices, institutional distortions of fighting for rent are typical, and a long-term increase in demand for food and agricultural products will deepen the dependence of domestic export on global demand conditions. This means that the choice of institutional modality for NBU functioning should rely on examples of countries where resource wealth is not dominant. Monetary policy enjoys institutional protection and is seen as an important principle of macroeconomic policy in countries with representative resource wealth or an insignificant share of commodity exports. The need to follow the chosen path to strengthen NBU independence should not be conditional on cooperation with the IMF or the choice for European integration (compliance of a formal status with assessment criteria within the ECB Convergence Report), but on a political and economic consensus with regard to structural reforms aimed at the creation of a society with high-quality institutions. In this context, the intention of the NBU to implement the mandate of price stability must be clearly crystallized, the procedure for appointment of management allows room for improvement due to increasing public awareness of the position of candidates on key areas of the central bank ex ante, quasi-fiscal operations should be minimized, and fiscal dominance should be eliminated. The same applies to the role of the exchange rate in macroeconomic priorities. Maintaining the relative stability of the realexchange rate through a soft devaluation response to a decrease in commodity prices may be involved as a short-term measure. In the long run, it will turn into subsidizing commodities exporters. The policy of price stability and soft devaluation of the National Bank of Poland took place under a very different export structure and quality of institutions and therefore it cannot be similarly reproduced.

## E. Conclusions

Studies of the relationship between CBI and the macroeconomic situation have distinguished two generations. Within the first, an emphasis was given to the specification of the independence index and interpretation of theoretically predictable relationships and deviations therefrom. Within the second, an emphasis was given to identification of drivers of enhancing the independence level and its relationship with political and institutional characteristics of countries. Recently, the unambiguous tendency with regard to the enhancement of CBI has been formed in the world, and the quality of institutions and the quality of democracy are recognized as the most important of its drivers. Commodity economies have evolved in a separate class of theoretical and empirical studies, which emphasize the issue of the fight for rents, the impact of such a fight on the frustration of institutions, a specific formulation of macroeconomic policy priorities, benefits of the choice of a fixed rate, and orientation on the accumulation of external assets. Custom macroeconomic priorities and institutional distortions are assumed as determinants of less independent central banks in resource-rich countries. This hypothesis has been confirmed on the basis of an inter-group comparison of the average group values of the independence index and the index of transparency of monetary authorities. The regression analysis with examples from 150 countries showed that the commodity factor has a rather indirect impact (through an inverse relationship between resource wealth and the level of democracy and a direct relationship between the latter and the GMT-index) on the level of CBI. Thus, the past inflation experience factor together with the quality of democracy is more significant, which suggests a possible nonlinear relationship between the resource wealth variable and the independence of monetary authorities. Intergroup comparisons showed that by the GMT-index, by the CWN-index, and by the transparency index, the level of CBI in countries classified as commodities exporters appeared to be lower than by a group of countries with emerging markets and developing countries. In commodity economies, there is also a tendency to increase CBI, but its level is significantly lower than in countries where the resource factor is not dominant. The analytical structure of macro-political models in commodity economies and institutional distortions therein allows for an explanation of the reason for more dependent central banks. The political and economic costly characteristics of tax collection, the fight against the "Dutch disease," the phenomenon of exchange reserves as a quasi-sovereign wealth fund, the phenomenon of a "predatory government", the "voracity effect," the exchange measurement of rent origin have been highlighted and analyzed in the context of features of the choice of a foreign exchange regime, and the impact on policy in terms of exchange reserves and seigniorage, due to which the theoretical explanation of a functional view of a less independent central bank in commodity economies has been given. Next to that, the objectionable optimality of such an institutional choice is recognized. It is asserted that the risks of strengthening the resource dependency of the domestic economy must be considered in the context of quality institution formation policy, within which the NBU's independence is a fundamental principle of macroeconomic stability.

## References

- Acemoglu D., Johnson S., Querubin P., Robinson J. (2008). When Does Policy Reforms Works? The Case of Central Bank Independence. NBER Working Paper. No14033.: 1-73.
- Aliyev I. (2013). Procyclicality in Resource-Rich Countries. Ministry of Finance of the Czech Republic Working Paper. No. 1/2013.: 1-24.
- Aliyev R. (2012). Monetary Policy in Resource-Rich Developing Economies.CERGE-EI Working Papers. No. 466.: 1-49.
- Aliyev R. (2014). Determinants of the Choice of Exchange Rate Regime in Resource-Rich Countries.CERGE-EI Working Papers. No. 527.: 1-36.
- Arezki R., Bruckner M. (2010). Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect. IMF Working Paper. WP/10/209.: 1-25.
- Arnone M., Laurens B., Segalotto J-F. (2006). The Measurement of Central Bank Autonomy: Survey of Models, Indicators, and Empirical Evidence. IMF Working Paper. WP/06/227.: 1-56.
- Arnone M., Laurence B., Segalotto J-F., Sommer M. (2007). Central Bank Autonomy: Lessons from Global Trends. IMF Working Paper. WP/07/88.: 1-53.
- Auty R. (2001). The Political Economy of Resource-driven Growth.European Economic Review. 45: 839-46.
- Auty R. (2001). Resource Abundance and Economic Development. Oxford: Oxford University Press.
- Berggren N., Daunfeldt S.-O., Hellstrom J. (2012). Social Trust and Central Bank Independence. Paper Presented at World Congress of Public Choice Societies, Miami.: 1-23.
- Bodea Cr., Hicks R. (2012). Price Stability and Central Bank Independence: Discipline, Credibility and Democratic Institutions. November 6.: 1-42.
- Crowe C., Meade E. (2008). Central Banks Independence and Transparency: Evolution and Effectiveness. IMF Working Paper WP/08/119: 1-30.
- Cukierman A. (1992). Central Banking Strategy, Credibility, and Independence: Theory and Evidence. Cambridge, Mass.: MIT Press.
- Cukierman A. (2008). Central Bank Independence and Monetary Policymaking Institutions: Past, Present, and Future. European Journal of Political Economy. Vol. 24. (4):. 722-36.
- Cukierman A., Webb S., Neyapti B. (1992). Measuring the Independence of Central Banks and Its Effect on Policy Outcomes. World Bank Economic Review 6 (3): 353-98.
- Debelle G., Fischer S. (1994). How Independent Should Central Bank Be? Goals, Guidelines and Constraints Facing Monetary Policymakers, ed. by J. Fuhrer, 195-221. Boston: Federal reserve Bank of Boston.
- Dincer N., Eichengreen B. (2014). Central Bank Transparency and Independence: Updates and New Measures. International Journal of Central Banking.Vol. 10. No.1. (March):. 189-253.
- Dreher A., Sturm J.-E., de Haan J. (2007). Does High Inflation Cause Central Bankers to Lose Their Job? Evidence Based on a New Data Set. KOF Working Papers. No. 167.: 1-21.
- Eijffinger S., Schaling E. (1993). Central Bank Independence in Twelve Industrial Countries. BancaNazionale del Lavoro Quarterly Review 184 (March): 49-89.
- Frankel J. (2010). How Can Commodity Producers Make Fiscal and Monetary Policy Less Procyclical?. Paper Presented on High Level Seminar on Natural Resources, Finance and Development, Algiers, Nov. 4-5, 2010.: 1-34.
- Frankel J., Smit B., Sturzenegger F. (2008). Fiscal and Monetary Policy in Commodity Based Economy. Economics of Transition. 16. No. 4.: 417-48.

- Grilli V., Masciandro D., Tabellini G. (1991). Political and Monetary Institutions and Public Financial Policies in the Industrial Countries. *Economic Policy* 6 (13): 341-92.
- Habib M.M., Manolova Kalamova M. (2007). Are There Oil Currencies? The Real Exchange Rate of Oil Exporting Countries. *ECB Working Paper. No. 839.*: 1-39.
- Hausmann R., Rigobon R. 2002. An Alternative Interpretation of the “Resource Curse”: Theory and Policy Implications. *NBER Working Paper. No. 9424.*: 1-59.
- Heimonen K., Maslowska- Aliyev I. (2013). Fiscal Policy Jokinen A. 2014. Central Bank Independence and Sovereign Debt Crisis. *Any Link? Aboa Centre for Economics Discussion Paper. No. 93.*: 1-29.
- IMF. (2015). Where Are Commodity Exporters Headed? Output Growth in the Aftermath of the Commodity Boom. *World Economic Outlook. October. 2015. Chapter 2.*
- Jacome L. (2001). Legal Central Bank Independence and Inflation in Latin America During the 1990s. *IMF Working Paper. WP/01/212.*: 1-40.
- Jacome L., Mancini-Griffoli T. (2014). A Broader Mandate. *IMF Finance and Development. June.*: 47-50.
- Jacome L., Vazquez F. (2005). Any Link Between Legal Central Bank Independence and Inflation? Evidence from Latin America and the Caribbean. *IMF Working Paper. WP/05/75.*: 1-41.
- Koziuk V. (2004). Central Bank Independence. *Ternopil. Carte Blanche. 248 p.*
- Koziuk V. (2005). Monetary problems of Global Financial Architecture Functioning. *Ternopil. Aston. 512 p.*
- Koziuk V. (2009). Monetary Foundations of Global Financial Stability. *Ternopil. TNEU, Economic Thought. 728 p.*
- Koziuk V. (2015). Central Bank Independence after Global Financial Crisis: Grey Zone of Status Quo. *Visnyk of the National Bank of Ukraine. No. 2, pp. 16–25.*
- Kurronen S. (2012). Financial Sector in Resource-Dependent Economies. *BOFIT Discussion Papers. No. 6.*: 1-35.
- Lucotte Y. (2009). The Influence of Central Bank Independence on Budget Deficits in Developing Countries: New Evidence from Panel Data Analysis. *Universited’Orleans, CNRS. May.*: 1-31.
- Lybeck T. (1998). Elements of Central Bank: Autonomy and Accountability. *IMF Occasional Paper. OP/98/1.*
- Mattoo A., Subramanian A. (2008). Currency Undervaluation and Sovereign Wealth Funds: A New Role for the World Trade Organization. *Institute for International Economics Working Paper. WP-08-02.*
- Obstfeld M. (2000). Globalization and Macroeconomics. *NBER Reporter. Fall.*
- Rogoff K. (1985). The Optimal Degree to Commitment to a Monetary Target. *Quarterly Journal of Economics. No. 100.*: 1169-90.
- Romelli D. (2015). Regulatory Reforms and Central Bank Independence. *University of Cergy-Ponoi.*
- Siklos P. (2002). The Changing Face of Central Banking: Evolutionary Trends Since World War II. *Cambridge: Cambridge University Press.*
- Siklos P. (2008). No Single Definition of Central Bank Independence is Right for All Countries. *Paolo Baffi Centre Research Paper. 2008-02:* 1-42.
- Wills S., van der Ploeg R. (2014). Why Do So Many Oil Exporters Peg Their Currency? Foreign Reserves As A De-facto Sovereign Wealth Fund. Paper Presented at the joint RES-SPR Conference on “Macroeconomic Challenges Facing Low-Income Countries”. *IMF. Wash. DC. – Jan. 30-31, 2014.*