



# GENERAL PROBLEMS OF THE MODERN RESEARCH AND INNOVATION POLICY

<https://doi.org/10.15407/scine16.03.003>

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## DECOUPLING ANALYSIS OF UKRAINE'S ECONOMY IN TERMS OF ITS SUSTAINABLE DEVELOPMENT

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**Introduction.** *Timely decoupling analysis of economic growth, environmental pressure, and resource consumption in the country enables determining whether it is actually moving towards sustainable development, and how modern and efficient the methods of economic and environment management are in Ukraine.*

**Problem Statement.** *The existing decoupling studies in Ukraine don't take into account the impact of economic development on the environment and the resources consumption.*

**Purpose.** *To make decoupling analysis of Ukraine's economy by the factors of environmental pressure and resources consumption in dynamics for 2013–2017.*

**Materials and Methods.** *The dialectical method of scientific knowledge, as well as observation, comparison, analytical, and statistical analyses have been used.*

**Results.** *The study of decoupling factors in terms of the environmental pressures and resource consumption has revealed the absence of a relative decoupling effect in 2013–2017 at the national level, as decoupling factors were unstable and negative in some years. The analysis of the decoupling indices on environmental pressures in the Ukrainian economy has shown that there was a predominantly recessive dependence between economic development and pollution factors in 2013–2015. A negative expansive decoupling was recorded in 2017 between the GDP growth and the rate of unregulated waste water discharge into surface water bodies and the generation of waste of IV hazard class. In 2017, an expansive relation was recorded between GDP growth and aggregate environmental pressure. Also, there was a negative decoupling in the economy of Ukraine between economic development and consumption of fuel resources from wood (overcoupling).*

**Conclusions.** *The absence of relative decoupling effect in the general dynamics in 2013–2017 by the factors of environmental pressure and resource consumption testifies to the existence of significant problems in Ukraine in terms of achieving sustainable development and the necessity of decoupling tool application while forming strategic plans.*

*Keywords:* decoupling, resource use, environmental pressure, overcoupling, and sustainable development.

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Citation: Ivanov, S.V., Vatchenko, O.B., Svystun, K.O., Vatchenko, B.S., and Razumova, H.V. Decoupling Analysis of Ukraine's Economy in Terms of its Sustainable Development. *Sci. innov.* 2020. V. 16, no. 3. P. 3–13. <https://doi.org/10.15407/scine16.03.003>

It is generally accepted that economic growth inevitably requires more and more resources and escalates environmental pressure. That is why, one of the most difficult problems in terms of mankind survival in all civilized, advanced economies is to achieve decoupling i.e. to break the links between high economic growth, on the one hand, and environmental pressure and resource consumption, on the other hand. The effect of decoupling shows the ability of the economy to grow without increasing the environment burden [1]. This means that advanced economies, by implementing innovative, resource-saving, waste-free, "green" technologies and technological processes and systematically reducing all types of environment pollution, reach high rates of production without extensive use of resources and deterioration of the conditions of ecological system and human habitat.

To determine how well countries are moving towards sustainable development and "green" growth, researchers use decoupling analysis of their economies. Based on calculated decoupling indices and decoupling factors they determine a decoupling situation and the presence or the absence of decoupling, i.e. separation of economic growth from environmental pressure and resource consumption.

Many foreign researchers (J. Vehmas, P. Malaska, J. Luukanen [2], P. Tapio [3], H.E. Daly, a theorist of the economics of sustainable development [4], British researcher T. Jackson [5], and others) have contributed to decoupling analysis in the context of correlation between economic growth, environmental pressure and resource consumption. The same issues have been studied by natural resources experts from the International Resource Panel under the United Nations Environment Program (UNEP), namely: E. U. von Weizsäcker, J. de Lardereel, K. Hargroves, C. Hudson, M. Smith, M. Rodriguez (2011) [6], M. Fischer-Kowalski, M. Swilling, Y. Ren, Y. Moriguchi, W. Crane and others (2014) [7]. The full report of this working group was published in 2016 [8]. Decoupling analysis of Ukraine's economy in terms of environmental pressure factors and re-

source factors has been done by O.O. Veklich and B.M. Danylyshyn [9], O. V. Kubatko [10], O.M. Tur [11], N.V. Bobrovska and A.H. Kostyrko [12], A. Gorskyi [13], as well as I.M. Sotnyk and L.A. Kulyk [14].

According to the results of the decoupling analysis of domestic natural material resources consumption (DNMRC) in the economy of Ukraine, as carried out by researchers of the Vienna University of Economics and Business in 2017, there was found a recession in the resource decoupling in terms of DNMRC as a result of economic recession in Ukraine and a slump in GDP, in 1992–1998. The relative decoupling in terms of DNMRC in Ukraine's economy was reported in 1999–2006, when the GDP growth rate was higher than the DNMRC rate. In 2007–2013, Ukraine's economy was characterized by overcoupling in terms of DNMRC, i.e. the consumption of resources was more intensive than an increase in GDP [15].

However, the existing research on decoupling in Ukraine does not take into account the impact of economic development on the environment and resource consumption in the country in the period 2013–2017, as in 2013–2015, its economy was recessing, the country was experiencing an economic crisis and showing very low, sometimes negative, growth rate; since 2014, Ukraine has been actively implementing energy saving measures in the fuel and energy sector.

The purpose of this research is to perform a decoupling analysis of Ukraine's economy by factors of environmental pressure and resource consumption in 2013–2017. This requires a study of dynamics of absolute and relative decoupling of economic growth from environmental pressure/resource consumption in Ukraine in 2013–2017 with the identification of decoupling situations in terms of environmental pressure and cases of overcoupling in terms of resource consumption in the economy of Ukraine based on relative indicators, as well as the definition of integrated indicators of total environmental pressure and consumption resources.

To calculate the indicators of decoupling in terms of environmental pressure factors, there have been used two main indicators of atmospheric pollution (the amount of pollutant emissions and the amount of carbon dioxide (the major greenhouse gas) emissions into the atmosphere from stationary sources of pollution; indicator of hydrosphere pollution (discharge of polluted return water into surface water bodies); as well as two main indicators of lithosphere pollution (the amount of I–III hazard class waste and that of IV hazard class waste).

The calculation of resource decoupling is based on indicators of consumption of the three main resources: water, fuel for industrial and household needs (taking into account sales to population and retail sales through gas stations) and production of merchantable wood, as well as on indicators of the five most common types of fuel: coal, natural gas, gasoline, diesel oil, firewood for heating, fuel briquettes and pellets from wood and other natural raw materials.

To determine whether Ukraine has managed to achieve the effect of decoupling in absolute terms of environmental pressure and resource consumption, it is advisable to analyze them for 2013–2017 [16, 17]. These indicators are input data for calculating the relative indicators of decoupling of Ukraine's economy in the context of its sustainable development.

The analytical data processing has showed that absolute decoupling in terms of environmental pressure in Ukraine in 2013–2017 was not reported. The same is true for that in terms of most of the consumed resources, as their absolute values did not show any trend to annual decrease during this period. Absolute decoupling in Ukraine was achieved only in terms of gasoline consumption that was dropping annually, from 3794.3 thousand tons (in 2013) to 1985.9 thousand tons (in 2017).

If to use the base for 2014 as reference for comparison, one can see that the absolute values of some types of environmental pressure, as well as resources consumed in 2017 were the lowest for the period under review, and accounted for, as compared with 2014:

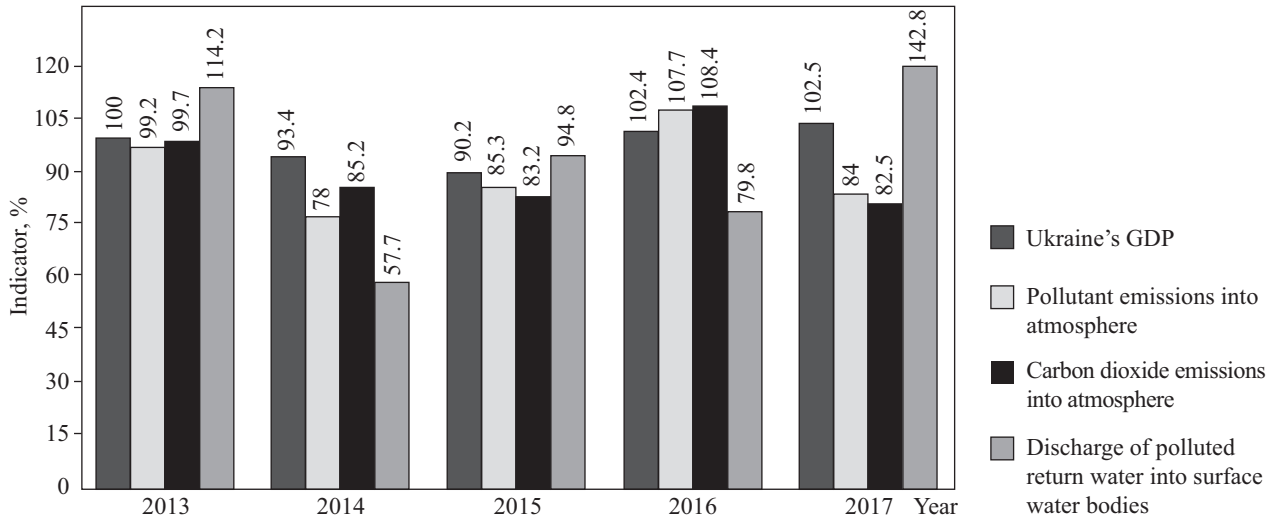
- ◆ emissions of pollutants and carbon dioxide into the atmosphere from stationary sources: 77.2% for both types of pollution;
- ◆ generation of I–III hazard class waste: 81.8%;
- ◆ water consumption: 78.7%;
- ◆ consumption of fuel for industrial and household needs: 83.6%;
- ◆ consumption of coal and natural gas: 79.2% and 81.6%, respectively.

It should be noted that, in 2017, the merchantable wood production amounted to 103.2% of that of 2014, but was slightly lower than in 2015–2016. The consumption of gasoline in 2017 ac-

**Table 1. Decoupling Factors in Terms of Environmental pressure in Ukraine's Economy. in 2013–2017**

Indicator	Year				
	2013	2014	2015	2016	2017
Decoupling factor in terms of:					
pollutant emissions	0.008	0.165	0.054	−0.052	0.181
carbon dioxide emissions	0.003	0.087	0.077	−0.058	0.195
polluted return water discharge into surface water bodies	−0.142	0.382	−0.051	0.221	−0.394
I–III hazard class waste generation	0.168	0.135	0.120	−0.033	0.049
IV hazard class waste generation	0.003	0.146	0.025	0.075	−0.208
Integral decoupling factor in terms of environmental pressure from the five types of pollution	0.013	0.189	0.047	0.037	−0.011

Source: estimated by the authors based on the data of [18, 16, 17].



**Fig. 1.** Economic growth, pollution of atmosphere, and surface water bodies in Ukraine, in 2013–2017, % [16–18]

counted for 94.7% of that of 2014 but was a little bit higher than in 2015–2016. In 2017, the use of firewood for heating and fuel briquettes in the period under review was the largest and made up 134.8% and 295.5%, respectively, of that of the indicators for 2014.

To discard or to prove the existence of relative decoupling in terms of environmental pressure in Ukraine's economy in 2013–2017, it is advisable to analyze the calculated decoupling factors (Table 1).

The decoupling factors in terms of pollutant emissions and carbon dioxide emissions in 2013–2017 were unstable, while in 2016–2017, they were negative, so there was no relative decoupling in terms of these indicators.

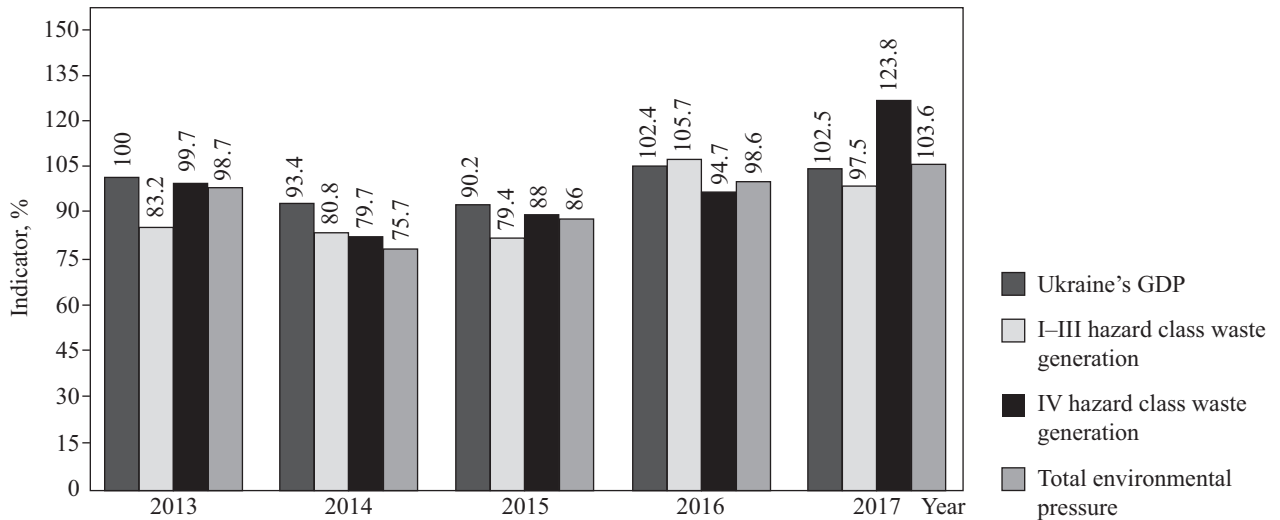
The decoupling factor in terms of discharged polluted return waters was negative in 2013, 2015, and in 2017. This means an increase in environmental pressure, therefore no decoupling effect in terms of this type of pollution is reported for the entire period.

The decoupling factor in terms of I–III hazard class waste generation showed a decrease in 2013–2016 and reached a negative value in 2016, i.e. the environmental pressure from this type of pollution in Ukraine increased in 2013–2016.

The decoupling factor in terms of IV hazard class waste generation was unstable, whereas in 2017, it became negative.

In 2014–2017, in Ukraine, the integrated decoupling factor in terms of environmental pressure was descending and became negative, in 2017. Thus, according to the analysis of the above indicator, since 2014, in Ukraine, the total environmental pressure on the atmosphere, hydrosphere, and lithosphere from the five types of pollution has been slowly increasing.

According to the classification of P. Tapio [3] (for pollutants and carbon dioxide emissions and discharges of polluted return water into surface water bodies), the decoupling is expressed using the GDP index (Fig. 1). In 2013 and 2017, this index (100% and 102.5%, respectively) was higher than the growth rates of pollutant emissions and carbon dioxide emissions, which decreased in those years, with the most significant drop reported in 2017, up to 84% and 82.5% respectively. The decoupling indices in these two years for the mentioned types of pollution ranged from 0.805 to 0.997. In 2014–2015, there was a decrease in the country's GDP with a simultaneous decline in emissions of pollutants and carbon dioxide. At that time, the decoupling indices ranged from



**Fig. 2.** Economic growth, hazardous waste generation, and total environmental pressure in Ukraine, in 2013–2017, % [16–18]

0.835 to 0.946. Therefore, in 2013 – 2015 and in 2017, there was a recessive relationship between pollution and economic development, i.e. a recessive coupling.

The growth rates of both types of pollution (pollutants and carbon dioxide emissions) in 2016 were 107.7% and 108.4%, respectively, and the GDP growth rate in the country accounted for 102.4%. The decoupling indices for these types of pollution in this period were 1.052 and 1.058, respectively, so there was reported an expansive coupling of pollutants/carbon dioxide emissions with economic growth.

The rates of discharge of polluted return waters into surface water bodies in 2013 and 2017 made up 114.2% and 142.8%, respectively, and exceeded the growth rates of Ukraine's GDP. The decoupling indices for this type of pollution in these years were equal to 1.142 and 1.394, respectively, so in 2013, there was observed an expansive coupling of this type of pollution with economic growth, while in 2017, one could see an expansive negative decoupling. A synchronous decrease in the discharge of polluted return waters and economic growth was observed in 2014–2015, when the decoupling indices amounted to 0.618 and 1.051, respectively. Thus, in 2014, there was reported a weak decoupling of pollution

from economic growth, which was followed by a recessive coupling, in 2015.

In 2013 – 2017, in Ukraine, decoupling was determined by the GDP growth rate, the I–III and IV hazard class waste generation, and by the overall rate of environmental pressure in terms of pollution factors (Fig. 2), according to the classification of P. Tapio [3]. The decoupling indices in terms of I–III hazard class waste generation in this period varied from 0.832 to 1.033. In 2013–2015, the rate of generation of these wastes decreased in line with the rate of economic development in the country, so there was observed a recessive coupling of economic growth with the indicator. In 2016, the rate of I–III hazard class waste generation (105.7%) exceeded the rate of GDP growth (102.4%). This meant an expansive coupling in terms of these indicators. In 2017, the rate of I–III hazard class waste generation slowed down (97.5%) while Ukraine's GDP increased (102.5%). However, the value of the decoupling index for this type of pollution (0.951) does not allow us to classify this situation.

In 2013–2016, in Ukraine, the decoupling indices for the generation of IV hazard class waste ranged from 0.854 to 0.997, and the rate of generation of this type of pollution decreased simultaneously with a decline in GDP growth, while the

country's economy was in recession. Therefore, in 2013–2016, there was a recessive relationship between the indicators.

In 2017, the index of decoupling for the generation of IV hazard class waste was 1.208 and showed a negative expansive decoupling, i.e. the rate of pollution (123.8%) exceeded the rate of economic growth (102.5%).

In 2013–2016, the total environmental pressure on the atmosphere, hydrosphere, and lithosphere from the five types of pollution in Ukraine was lower than the GDP growth rate, while in 2017, it amounted to 103.6%, slightly exceeding the GDP growth rate. The integral indices of decoupling for total environmental pressure varied from 0.811 to 0.987; in 2017, it came to 1.011. Thus, in 2013–2016, there was reported a recessive coupling of total environmental pressure with GDP growth, followed by an expansive coupling, in 2017.

To discard or to prove the existence of relative resource decoupling in the economy of Ukraine in 2013–2017, we have analyzed the calculated relative values, i.e. the decoupling factors in terms of resource consumption (Table 2).

Based on the analysis of the results, the decoupling factors of economic development have been identified with the use of the studied resources, namely:

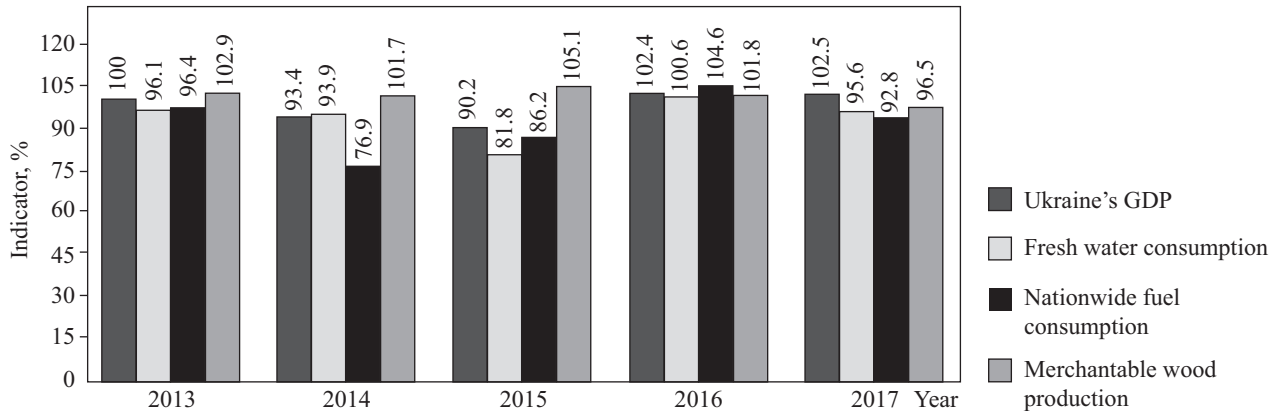
- ◆ in 2013–2017, for fresh water consumption and total consumption of fuel in Ukraine the obtained data do not suggest a relative decoupling for this period, although the values for these types of resources are mostly positive, except for fresh water consumption, in 2014, and total consumption of fuel, in 2016;
- ◆ in 2013–2015, in terms of merchantable wood production in the country, the decoupling factors were negative, showing a decline from –0.029, in 2013, to –0.165, in 2015, and indi-

**Table 2. Decoupling Factors in Terms of Resource Consumption in Ukraine’s Economy, in 2013–2017**

Показник	Роки				
	2013	2014	2015	2016	2017
Decoupling factor in terms of:					
consumption of fresh water	0.039	–0.006	0.093	0.017	0.067
general consumption of fuel for industrial and household needs (sales to the population and retail sales through gas stations included)	0.036	0.177	0.045	–0.021	0.095
merchantable wood production	–0.029	–0.089	–0.165	0.006	0.059
coal	0.028	0.189	0.068	–0.050	0.145
natural gas	0.067	0.138	0.057	–0.011	0.095
gasoline	0.054	0.124	0.157	0.078	0.131
diesel fuel (gas oil)	0.024	0.020	0.027	–0.017	–0.011
firewood for heating	–0.050	–0.092	–0.322	–0.056	–0.020
fuel briquettes and pellets from wood and other natural raw materials	–	–0.803	–0.969	–0.448	–0.095
Integral decoupling factor in terms of consumption of the three types of resources (fresh water, fuel for industrial and household needs, merchantable wood production)	0.016	0.034	–0.003	0.001	0.074
Integral decoupling factor in terms of consumption of the six (in 2013, the five) fuels	0.026	–0.028	–0.110	–0.073	0.045
Integral decoupling factor in terms of consumption of the eight (in 2013, the seven) types of resources, except for fuel for industrial and household needs	0.020	–0.033	–0.089	–0.051	0.050

Source: calculated by the authors based on the data of [17, 18].





**Fig. 3.** Economic growth, consumption of fresh water, fuel, and merchantable wood production in Ukraine, in 2013–2017, % [17, 18]

cated an excessive extensive use of this resource; in 2016–2017, the decoupling factors for this resource were positively growing, i.e. in this two-year period, there was reported a weak trend towards decoupling;

- ◆ in 2013–2017, the consumption of coal and natural gas was unstable and had negative values, in 2016, for both types of resources, so there was no relative decoupling observed;
- ◆ in 2013–2017, the decoupling factors were positive in terms of gasoline consumption, however, they did not show an upward trend over the period, i.e. no relative decoupling was achieved;
- ◆ in 2013–2017, the indicators related to diesel fuel consumption were unstable, while in 2016–2017 they had negative values, which could be interpreted as certain increase in the use of this fuel in the last two years as compared with the previous ones;
- ◆ only negative decoupling factors were reported for the consumption of firewood for heating, in 2013–2017, and fuel briquettes and pellets from wood and other natural raw materials, in 2014–2017, which indicated an annual increase in the nationwide use of wood as a material for heating.

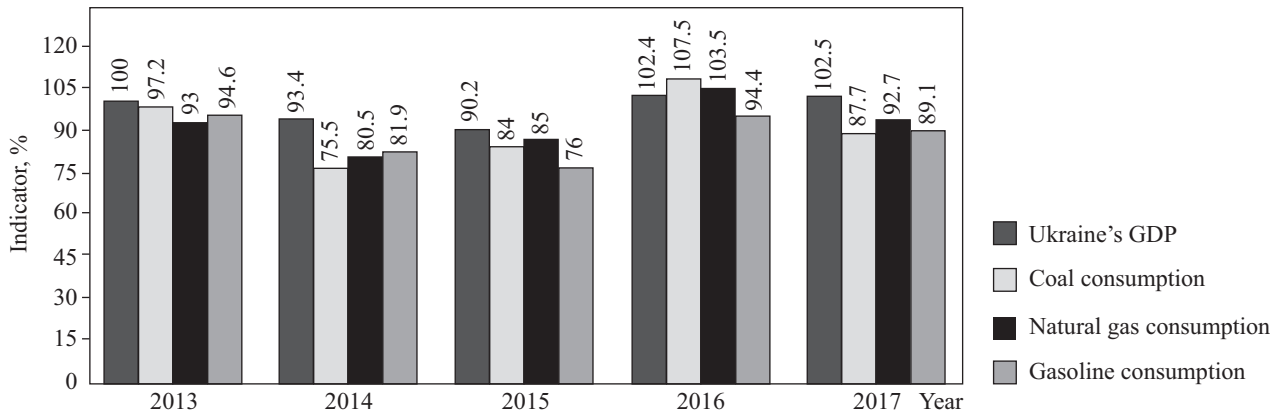
In 2013–2017, in Ukraine, the integrated decoupling factor in terms of the consumption of three types of resources (fresh water, fuel for production and household needs, and merchantable

wood production) were unstable as they increased in 2013–2014 and in 2016–2017. Maintaining the upward trend of integrated decoupling factor for the group of three types of resources in the upcoming years means achieving a relative decoupling in terms of their total consumption. Reducing their consumption under conditions of economic growth is a key to successful sustainable development of Ukraine.

In Ukraine, the integral decoupling factors for the consumption of the six (in 2013, the five) types of fuel resources and for the consumption of the eight (in 2013, the seven) types of resources, without the overall indicator of fuel consumption for production and household needs taken into consideration, had negative values, in 2014–2016, i.e. in the analyzed periods the consumption of these groups of resources increased, therefore, there was reported no relative decoupling for 2013–2017.

To identify or to discard an overcoupling of economic growth with the resource factors in the country for the period 2013–2017, the GDP growth rate of, the consumption of water, fuel for industrial and household needs (including sales to population and retail sales through gas stations), as well as the merchantable wood production in Ukraine have been studied (Fig. 3).

The rates of fresh water consumption in 2013 and in 2015–2017 were lower than the rates of economic growth of Ukraine, expressed in terms



**Fig. 4.** Economic growth and consumption of coal, natural gas, and gasoline in Ukraine, in 2013–2017, % [10, 17, 18]

of GDP. In 2014, the rate of fresh water consumption (93.9%) exceeded by 0.5 b. p. the growth of Ukraine's GDP (93.4%), but this situation could not be considered as overcoupling, because in 2014, both indicators decreased as compared with the previous year.

In Ukraine, a single case of overcoupling of economic growth with fuel consumption was recorded in 2016, when the rate of consumption of this resource (104.6%) slightly exceeded the GDP growth rate (102.4%).

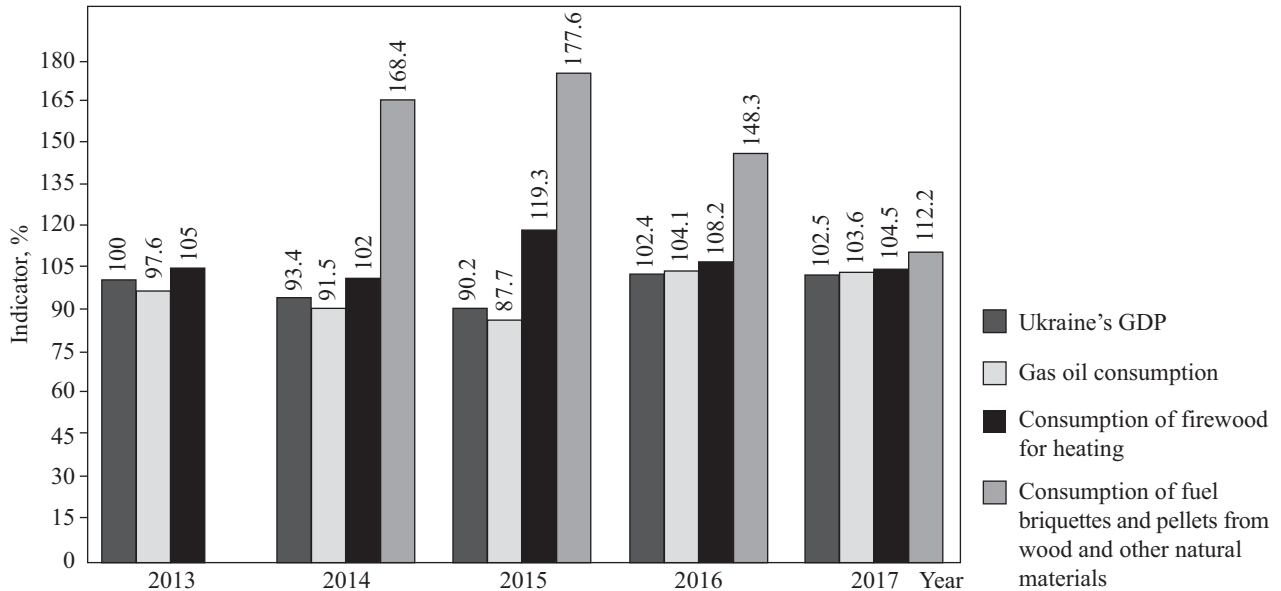
Overcoupling of economic growth in Ukraine with the merchantable wood production was recorded in 2013–2015, when the growth rate of this production (102.9%, 101.7%, and 105.1%, respectively) exceeded the GDP growth rate (100%, 93.4%, and 90.2%, respectively). One could state that this resource was extensively used in the period of no economic growth in the country at all.

Analyzing the GDP growth, the consumption of coal, natural gas, and gasoline in Ukraine in 2013–2017 (Fig. 4) helps to identify or to discard an overcoupling of economic growth with the consumption of these fuels at the national level, within the period under review. An overcoupling of economic growth in the country with the consumption of coal and natural gas was recorded in 2016, when the rate of consumption of these two fuels (107.5%, for coal, and 103.5%, for natural gas) exceeded the economic growth (102.4%).

Studying the GDP growth, the consumption of gas oil (diesel fuel), firewood for heating and fuel briquettes and pellets of wood and other natural raw materials in Ukraine in 2013–2017 (Fig. 5) helps to identify or to discard the overcoupling of economic growth in the country with the consumption of these resources. As the rates of gas oil consumption in 2016–2017 (104.1% and 103.6%, respectively) exceeded Ukraine's GDP growth (102.4% and 102.5%, respectively), there was reported an overcoupling of economic growth in the country with the consumption of the mentioned fuel in the specified period.

In 2013–2017, in Ukraine, the rate of consumption of firewood for heating (105%, 102%, 119.3%, 108.2%, and 104.5%, respectively) exceeded the GDP growth (100%, 93.4%, 90.2%, 102.4%, and 102.5%, respectively). The highest rate was recorded in 2015 (119.3%), when Ukraine's economy was "at the bottom" of the recession and the GDP (90.2%) was the lowest for the entire period. A similar situation was reported for the consumption of fuel briquettes and pellets from wood and other natural materials, the main raw material for the production of which was firewood. In 2014–2017, the rate of use of this rather new type of fuel for Ukraine (168.4%, 177.6%, 148.3%, and 112.2%, respectively) significantly exceeded the economic growth in this period. Thus, there was observed an overcoupling of Ukraine's economic growth with the use of firewood for heating.





**Fig. 5.** Economic growth and consumption of gas oil (diesel fuel), firewood for heating, and fuel briquettes and pellets from wood and other natural materials in Ukraine, in 2013–2017., % [17, 18]

ting, in 2013–2017, and fuel briquettes and pellets from wood and other natural raw materials, in 2014–2017. Also, there were observed cases of overcoupling of economic growth in the country with total consumption of the six types of fuel resources in 2015–2016, when the rate of their consumption (100.2% and 109.8%, respectively) exceeded the GDP growth (90.2% and 102.4%, respectively). An overcoupling of economic growth and total consumption of the eight types of resources was recorded in 2016 (107.6% against the GDP growth rate of 102.4%).

Thus, the analysis of decoupling factors in the economy of Ukraine in terms of environmental pressure and consumed resources has not shown any relative decoupling in the overall dynamics for the period 2013–2017. The analysis of decoupling indices of Ukraine's economy in terms of environmental pressure has reported mainly recessive coupling of economic development with environmental pressure, as a result of recession of Ukraine's economy, in 2013–2015. As the economic growth was resumed in the country, in 2016–2017, the rate of pollution began to change. A ne-

gative expansive decoupling of GDP growth with discharge of polluted return water into surface water bodies and generation of IV hazard class waste was recorded in 2017. This situation indicates the existence of certain problems in Ukraine in the context of sustainable development.

The analysis of GDP growth and resource consumption in Ukraine has shown a negative decoupling, or overcoupling of economic growth with merchantable wood production, in 2013–2015, the consumption of diesel fuel (gas oil), in 2016–2017, firewood for heating, in 2013–2017, and fuel briquettes and pellets from wood and other natural raw materials, in 2014–2017, which indicates an extensive use of these types of resources. As a result of increasing consumption of firewood for heating and fuel briquettes from wood and other natural raw materials, as well as growing development of alternative energy and energy-saving measures in the economy of Ukraine, in 2013–2017, a ricochet decoupling of the GDP growth from the total fuel (including natural gas) consumption was almost achieved. However, despite a slight reduction in environmental pressure

on economic development, the consumption of many groups of natural resources in Ukraine is not sufficiently efficient, i.e. is extensive.

Low technologies and outdated management methods are the main obstacles to a successful implementation of sustainable development goals. Its implementation in the country makes it important to achieve an innovative effect of decoupling, which is possible due to energy efficiency programs, measures for environment modernization of existing industrial enterprises, and construction of renewable energy facilities and new industrial enterprises based on "green" environment friendly technologies. A decoupling analysis shall be made while assessing the implementation of these mea-

asures that can be generally described as "green" modernization of Ukraine and its regions in order to accelerate their transition to a "green" economy. Decoupling targets can be used in the development of strategic plans for sustainable development of the country and its regions. Thus, the analysis of decoupling indicators in the coming years will enable assessing Ukraine's success or failure of on the path to sustainable development and, accordingly, identifying problems in terms of those types of environmental pressure and resources consumption, where negative trends expressed through a negative relationship or negative decoupling in terms of environmental pressure, or overcoupling in terms of resources have been found.

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Received 22.04.19

Revised 11.07.19

Accepted 16.09.19

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## ДЕКАПЛІНГ-АНАЛІЗ ЕКОНОМІКИ УКРАЇНИ ЩОДО ЇЇ СТАЛОГО РОЗВИТКУ

**Вступ.** Своєчасно виконаний декаплінг-аналіз показників економічного зростання, екологічного тиску та ресурсоспоживання в державі дозволяє визначити чи насправді вона успішно рухається до сталого розвитку, і наскільки сучасними й ефективними є способи господарювання і природокористування в ній.

**Проблематика.** Наявні дослідження декаплінгу в Україні не враховують впливу економічного розвитку на довкілля і споживання ресурсів.

**Мета.** Здійснити декаплінг-аналіз економіки України за факторами екологічного тиску і споживання ресурсів в динаміці за період 2013–2017 рр.

**Матеріали й методи.** Застосовано діалектичний метод наукового пізнання, а також методи спостереження, порівняння, аналітичний метод та метод статистичного аналізу.

**Результати.** Дослідження декаплінг-факторів за екологічним тиском і споживанням ресурсів виявило відсутність ефекту відносного декаплінгу за 2013–2017 рр. на національному рівні, оскільки декаплінг-фактори були нестабільними, а в окремі роки — від'ємними. Аналіз індексів декаплінгу за екологічним тиском в економіці України довів, що між економічним розвитком і чинниками забруднення у 2013–2015 рр. був переважно рецесивний зв'язок. Негативний експансивний декаплінг було зафіксовано у 2017 р. між темпами зростання ВВП і темпами скидання забруднених зворотних вод у поверхневі водні об'єкти та утворення відходів IV класу небезпеки. Між темпами зростання ВВП і сукупним екологічним тиском у 2017 р. зафіксовано експансивний зв'язок. Також, в економіці України було встановлено негативний декаплінг між економічним розвитком і споживанням паливних ресурсів з деревини (оверкаплінг).

**Висновки.** Відсутність ефекту відносного декаплінгу в загальній динаміці за 2013–2017 рр. за факторами екологічного тиску і споживання ресурсів свідчить про існування значних проблем щодо досягнення Україною сталого розвитку і про необхідність застосування інструменту декаплінгу при формуванні стратегічних планів.

**Ключові слова:** декаплінг, споживання ресурсів, екологічний тиск, оверкаплінг, сталий розвиток.