
ON MOLDOVA'S INCREMENTAL CAPITAL-OUTPUT RATIO AND THE DESIGN OF ECONOMIC POLICY

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DOI: <https://doi.org/10.36004/nier.es.2021.1-01>

JEL Classification: E17, E29

CZU: 330.55+338.2](478)

ABSTRACT

The paper analyses the notion of an economy's Incremental Capital-Output Ratio and proceeds to provide estimates of the Incremental Capital-Output Ratio for the Moldovan economy utilising National Accounts data. The purpose of the study is to calculate estimates of the Incremental Capital-Output Ratio for the Moldovan economy's transition period to date, utilise the derived estimates to analyse aspects of economic growth in Moldova over its transition period and use the average value of the Incremental Capital-Output Ratio over the recent period for simulation and forecasting purposes. On the whole the reported empirical estimates of the Incremental Capital-Output Ratio for the Moldovan economy lie within the range of values reported in the economic literature. Furthermore, the evolution of the Incremental Capital-Output Ratio in the first few years of sustainable growth in Moldova reflects the wide availability of unemployed or underemployed resources in the economy at the time thus allowing the achievement significant economic growth which was associated with low values of the Incremental Capital-Output Ratio over the period. The paper proceeds to utilise the recent Incremental Capital-Output Ratio estimates for the Moldovan economy over the period 2015 to 2019 inclusive to calculate an average estimate of the Incremental Capital-Output Ratio and use this average estimate to generate estimates of the Gross Fixed Capital Formation ratios as a share of GDP required to reach a number of indicative growth paths in the medium to long term. It is notable that the growth path which is attainable given current conditions in the economy is close to the latest medium term forecasts by International Financial Institutions and the Ministry of Economy and Infrastructure. The paper concludes by discussing the design of economic policy and development planning in Moldova and suggesting areas for further work.

Keywords: Gross Fixed Capital Formation, Gross Domestic Product, Incremental Capital-Output Ratio, economic policy

Lucrarea analizează noțiunea de Raportul incremental capital-ieșire (ICOR) al unei economii și prezintă estimări ale ICOR pentru economia Republicii Moldova, utilizând datele conturilor naționale. Scopul studiului este de a calcula estimările ICOR pentru perioada de tranziție a economiei Republicii Moldova până în prezent, de a utiliza estimările derivate pentru a analiza aspecte ale creșterii economice din Republica Moldova în perioada de tranziție și de a utiliza valoarea medie a ICOR din perioadă recentă pentru simulare și prognoză. În ansamblu, estimările empirice ale raportului incremental capital-ieșire (ICOR) pentru economie se încadrează în intervalul de valori raportate în literatura economică. În plus, evoluția raportului incremental capital-ieșire (ICOR) în primii câțiva ani de creștere durabilă reflectă disponibilitatea largă a persoanelor șomere sau subocupate în economie la momentul respectiv,

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permițând astfel realizarea unei creșteri economice semnificative care a fost asociată cu valori scăzute ale raportului incremental al producției de capital pe parcursul perioadei. În lucrare se utilizează estimările recente ale Raportului incremental capital-ieșire (ICOR) pentru economia Republicii Moldova în perioada 2015-2019, inclusiv pentru a calcula o estimare medie a ICOR și a utilizarea acesteia pentru a genera estimări ale ratelor brute de formare a capitalului fix ca pondere din PIB necesară pentru a atinge o serie de căi orientative de creștere pe termen mediu și lung. Este de remarcat faptul că calea de creștere care poate fi atinsă în condițiile actuale ale economiei este apropiată de cele mai recente prognoze pe termen mediu ale instituțiilor financiare internaționale și ale Ministerului Economiei și Infrastructurii. Lucrarea se încheie cu proiectarea politicii economice, planificarea dezvoltării în Republica Moldova și sugerând domenii pentru lucrări ulterioare.

Cuvinte cheie: Formarea brută a capitalului fix, Produsul Intern Brut, Raportul incremental capital-ieșire (ICOR), politică economică

В статье анализируется экономический термин Предельный коэффициент капиталотдачи (ICOR), а также осуществляются расчеты данного коэффициента для экономики Республики Молдова с использованием данных национальных счетов. Цель исследования - рассчитать значения Предельного коэффициента капиталотдачи для переходного периода молдавской экономики до настоящего времени, использовать полученные данные для анализа аспектов экономического роста в Республике Молдова в течение переходного периода и использовать среднее значение данного коэффициента за последний период с целью моделирования и прогнозирования. В целом, представленные эмпирические значения Предельного коэффициента капиталотдачи для экономики Республики Молдова находятся в пределах диапазона значений, приведенных в экономической литературе. Кроме того, эволюция Предельного коэффициента капиталотдачи в первые несколько лет устойчивого роста отразила наличие большого количества безработных или работников с неполной занятостью в экономике, в то же время это позволило добиться значительного экономического роста, который был связан с низкими значениями данного коэффициента за данный период. В статье используются последние рассчитанные данные Предельного коэффициента капиталотдачи для экономики Республики Молдова за период с 2015 по 2019 годы включая расчеты среднего значения данного коэффициента и использования данного среднего значения для получения оценок коэффициентов валового накопления основного капитала как доля ВВП необходимая для достижения ряда ориентировочных траекторий роста в среднесрочной и долгосрочной перспективе. Примечательно, что траектория роста, достигаемая в нынешних условиях в экономике, близка к последним среднесрочным прогнозам международных финансовых институтов и Министерства экономики и инфраструктуры. В заключении статьи предлагается к обсуждению разработка экономической политики и планирование развития в Республике Молдова, а также предлагаются направления для дальнейшей работы.

Ключевые слова: Валовое накопление основного капитала, валовой внутренний продукт, Предельный коэффициент капиталотдачи, экономическая политика

INTRODUCTION

The notion of an economy's Incremental Capital-Output Ratio (ICOR) has been widely used in theoretical and empirical work in economics. Following the seminal contributions by Harrod (Harrod, 1939) and Domar (Domar, 1946), estimates of an economy's ICOR have been widely used by analysts to generate medium to long term forecasts of economic growth as a function of a projected investment path in the future or to generate estimates of the required volume of investments to support the attainment of a targeted path of real Gross Domestic Product for the economy under consideration.

The purpose of this paper is to analyse the notion of the ICOR, provide estimates of the evolution of the ICOR for the Moldovan economy over its transition period to date and compare the derived estimates with the values expected from studies in the economic literature, analyse aspects of economic growth in Moldova in the light of the calculated ICOR estimates over time, utilise the average

value of the ICOR over the recent period to estimate the investment as a share of GDP which is required to reach a number of selected economic growth paths and discuss briefly the design of economic policy and development planning in Moldova.

The rest of the paper is organised as follows: The next section contains a brief literature review. It presents the definition of the ICOR and analyses briefly the ICOR's properties, it presents the hypothesis regarding the expected range of values of the ICOR according to the economic literature and discusses the use of the ICOR for policy-relevant simulation and forecasting purposes. The next section describes the data used for the analysis contained in the paper. These data include the annual evolution of the nominal Gross Fixed Capital Formation and the nominal GDP estimates, as well as the real annual GDP growth rates over the period 1995 to 2019 inclusive. The data section includes also an analysis of the evolution of the economy's output over Moldova's transition period. The paper's next section contains the main results of the paper. These include an analysis of the evolution of the ICOR over Moldova's transition period to date and the use of the average value of the ICOR over the period 2015 to 2019 to estimate the share of Gross Fixed Capital Formation in GDP required in order to reach a number of selected real annual growth paths. The paper concludes by discussing aspects linked to the design of economic policy and development planning in Moldova and suggesting areas for further work.

LITERATURE REVIEW

Following the seminal contribution in the economic literature by Harrod (Harrod, 1939) and Domar (Domar, 1946) the notion of an economy's ICOR has been widely used in theoretical and empirical work in economics.

More specifically estimates of an economy's ICOR have been widely used to generate:

- Medium to long-term forecasts of economic growth, as a function of a projected investment path in the future; or
- Estimates of the required volume of investments –or of the financing gap that need to be filled by additional investments- in order to support the attainment of a targeted path of real GDP for the economy under consideration.

We define the ICOR of an economy at time t by the following equation:

$$\text{ICOR} = I(t) / [\text{GDP}(t+1) - \text{GDP}(t)] \quad (1)$$

Equation (1) defines the ICOR as the ratio between:

1. Gross investment at t , $I(t)$; over
2. The increase in the economy's volume of Gross Domestic Product (GDP) between t and the next period, $t+1$ (i.e., the difference between $\text{GDP}(t+1)$ and $\text{GDP}(t)$, both measures in prices of time t).

Dividing the numerator and denominator of equation (1) by the economy's output at time t we arrive at the expression:

$$\text{ICOR} = \{I(t)/\text{GDP}(t)\} / \{[\text{GDP}(t+1) - \text{GDP}(t)]/\text{GDP}(t)\} \quad (2)$$

The numerator of equation (2) expresses the ratio of Gross Fixed Capital Formation to GDP, both measured at current prices of year t –which we will call the investment ratio. The denominator of equation (2) is the rate of growth of real GDP between time t and $t+1$.

With regard to the ICOR's characteristics and its range of values it is worth noting the following points:

- In general, economic growth in any economy emerges out of a combination of a number of factors of production which, -in addition to investment and its addition to an economy's stock of capital-, includes also: land, labour, entrepreneurship and managerial skills, and institutional arrangements. Growth may, therefore, emerge out of variations in the above-mentioned factors of production and their productivity through time and/or due to variations in their capacity utilisation.
- Equation (1) places emphasis on the importance of investment as a driver of economic

growth and, furthermore, assumes a 1-period time lag between investment and growth in output. Equation (1) implicitly assumes that the other factors of production in addition to capital will be forthcoming to support the growth process in the future.

- The typical value of the ICOR found in the economic literature is in the neighbourhood of 3. The available studies in the economic literature suggest that the ICOR value is likely to range between the values of 2 and 7, with the ICOR of industrialized countries expected to lie within the range of 3 to 3.5. This may be taken as the general hypothesis to be empirically investigated. A paper by Ramos, Pastor and Rivas (2008) provided estimates of the ICOR for the Latin American countries, with the average value of the ICOR for these economies being equal to 5.6.

- The ICOR is frequently thought of as providing an indication of the efficiency of investment in an economy. More specifically the lower the value of the ICOR the higher the efficiency of investment in the economy. This can be readily seen if we re-arrange equation (1) as follows: $GDP(t+1) = [I(t)/ICOR] + GDP(t)$. Now, and with the values of $GDP(t)$ and $I(t)$ given, the lower the value of the ICOR the higher the value of the economy's output in the next period, i.e. the higher the value of $GDP(t+1)$.

- The value of the ICOR is unlikely to remain constant over time and, as Gros and Steinherr (Gros & Steinherr, 1995) note, in Eastern Europe the assumption of a constant ICOR may only be a reasonable approximation towards the end of the adjustment phase.

- The ICOR for an economy should be estimated over a period which is considered as typical (or as normal) as possible, and is usually estimated as an average over several periods. Furthermore, the value of the ICOR is a function of the economy's relative position on the business cycle. As emphasised by Thirlwall (Thirlwall, 1989) in attempting to calculate ICORs the stage of the business cycle must always be born in mind. In particular, as noted by Thirlwall (Thirlwall, 1989), if the economy is working below capacity, very little extra capital will be needed to increase output and substantial growth may thus be associated with a relatively small ICOR value. In other words, it is well-known that if the economy is working well below capacity substantial growth may be associated with relatively low investment. We will return to this point when analysing the evolution of the ICOR in the Moldovan economy.

Turning to the use of the ICOR in empirical work, estimates of an economy's ICOR are frequently used to generate:

1. Medium to long-term forecasts of economic growth, as a function of a projected future investment path, as from equation (1), and with the level of real investment determined for any time t , it readily follows that the path of real GDP is determined by the relationship $GDP(t+1) = [I(t)/ICOR] + GDP(t)$.

2. Estimates of the required volume of investments –or the financing gap that need to be filled by additional investment projects- to attain a targeted path of GDP for the economy under consideration. Given a targeted path of real GDP over a future period, equation (1) may be re-arranged to provide a path of the required investment at any t through the relationship: $I(t) = ICOR [[GDP(t+1) - GDP(t)]]$.

To conclude the notion of the ICOR provides a useful conceptual framework for policy-relevant simulation and forecasting exercises, which is widely used mostly because of its simplicity. At the same time, as Easterly (2002) argued, it is worth keeping in mind that:

1. There is little empirical evidence to suggest that investment is either a necessary or a sufficient condition for economic growth in any economy; and
2. The emphasis placed upon simple calculations of investment needs and/or financing gaps has had the counterproductive effect of diverting attention from the deeper determinants of economic growth in any economy.

From a practical point our view is that the analyst and policy advisor in any economy must try to reach a judgement regarding

- The potential usefulness of the ICOR for analytical and forecasting purposes (and the plausible range of values for the economy under consideration); while

- Keeping in mind the need to avoid using the instrument in a mechanical way to generate simulations and forecasts, and the need to retain a focus on the deeper determinants of economic growth and welfare, which should be at the core of development planning and policy interventions in

the medium to long-term. We will return to this point in the concluding section of this paper which discusses the design of economic policy.

DATA AND OUTPUT DEVELOPMENTS OVER THE TRANSITION PERIOD

Table 1 below provides the data used for the analysis contained in the paper. The table reports the annual estimates of the nominal Gross Fixed Capital Formation in Moldova and Moldova's nominal GDP estimates, as well as the real annual GDP growth rates over the period 1995 to 2019 inclusive. The estimates were compiled by Moldova's National Bureau of Statistics and exclude the Transnistrian region.

Table 1

The evolution of the nominal Gross Fixed Capital Formation, the nominal GDP and the real annual GDP growth rates over 1995-2019

	Gross Fixed Capital Formation	Gross Domestic Product	Annual real GDP growth rate (%)
1995	1033791	6479715	-1.4
1996	1539894	7797562	-5.9
1997	1774214	8916975	1.6
1998	2011571	9122113	-6.5
1999	2271950	12321554	-3.4
2000	2472468	16019558	2.1
2001	3189965	19051531	6.1
2002	3681781	22555858	7.8
2003	5127275	27618918	6.6
2004	6786848	32031777	7.4
2005	9257932	37651869	7.5
2006	12691495	44754367	4.8
2007	18221720	53429571	3.0
2008	21391380	62921545	7.8
2009	13654952	60429803	-6.0
2010	19432907	86275377	7.1
2011	22877804	98772814	5.8
2012	24929093	105480184	-0.6
2013	27533035	119532871	9.0
2014	34562267	133481634	5.0
2015	35407562	145753642	-0.3
2016	35714916	160814564	4.4
2017	39868390	178880890	4.7
2018	46817866	192508553	4.3
2019	53012618	210378059	3.7

Source: National Bureau of Statistics

Note: The Gross Fixed Capital Formation and GDP estimates reported in table 1 are in MDL thousand. The 1995 to 2009 nominal Gross Fixed Capital Formation and nominal GDP estimates were compiled according to the SNA-93/ESA-95 compilation methodology, while the 2010 to 2019 estimates were compiled according to the SNA-2008/ESA-2010 methodology. The data reported in the table exclude the Transnistrian region

It is notable that the data over the period 1995 – 2010 reported in table 1 exclude the early transition years following Moldova's independence in 1991 that were characterised by a collapse in the economy's output. This significant drop in economic activity at the onset of the transition process has been common for many transition economies, but was particularly severe in the case of Moldova due to:

1. The adverse Terms of Trade effect following Moldova's independence. The breakup of the Soviet Union implied that the Moldovan economy lost access to both subsidized inputs to its production process

(including energy), as well as subsidized markets for its export industries. Indeed the empirical studies of Orłowski (Orłowski, 1993) and Tarr (Tarr David, 1994) suggest that Moldova was the hardest hit among all fifteen Former Soviet Union economies from the breakup of the Soviet Union;

2. The impact of natural disasters in 1992 and 1994; and
3. The adverse effect of the Transnistrian conflict in 1992.

It is clear from the evolution of the real GDP growth rate reported in table 1, that the economy experienced negative rates of growth over the period 1995 to 1999 inclusive, with the single exception being the very modest growth of 1.6 % achieved in 1997. From the year 2000 to the year 2008 inclusive the economy of Moldova experienced a sustainable growth in output. This sustained growth episode ended in 2009 when a significant drop of 6 % was registered in Moldova's real GDP reflecting the adverse effect of the international financial crisis on Moldova's economy. Growth resumed in 2010 and the period 2010-2019 is characterised by positive annual rates of growth of real GDP with the exceptions of the slight drops in real output registered in the year 2012 (-0.6 %) and the year 2015 (-0.3 %).

MAIN RESULTS

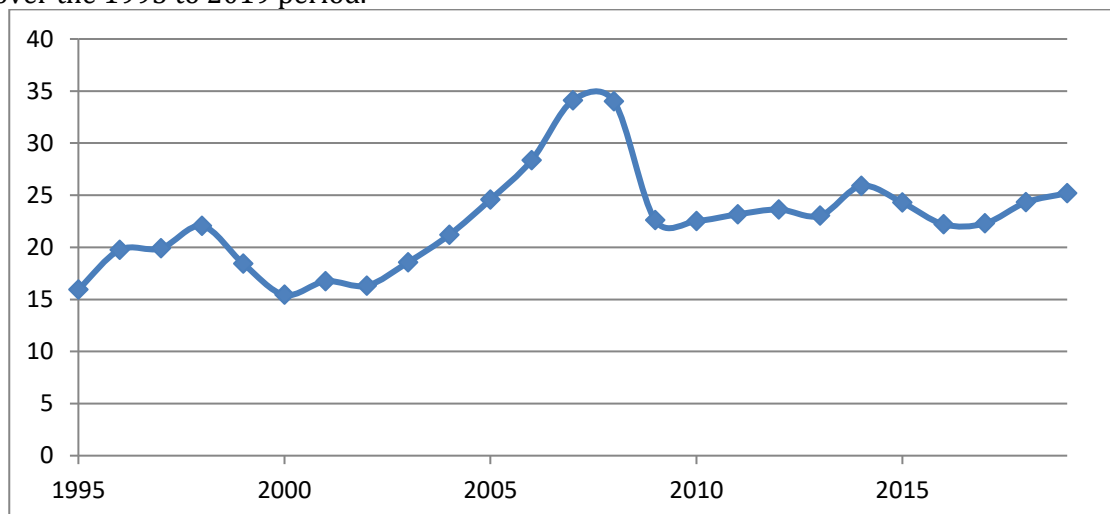
This section utilises the data reported in table 1 above to calculate and analyse the evolution of:

1. The Gross Fixed Capital Formation ratio as a share of GDP over the 1995 to 2019 period inclusive; and
2. The ICOR from the onset of sustained growth in the year 2000 onwards.

The methodology used to derive the ICOR estimates in the paper relies upon the calculation of the ICOR as determined by equation (2) analysed in the literature review section. The results reported below exclude estimates for years when in the next period the economy's real GDP registered a drop. As noted in the literature review section above, the ICOR for an economy should be estimated over a period which is considered as typical (or as normal) as possible, and is usually estimated as an average over several periods. After analysing aspects of economic growth in Moldovan in the light of the calculated ICOR estimates the paper proceeds to use the average value of the ICOR over a recent period to estimate the Gross Fixed Capital Formation ratio as a share of GDP required in order to reach selected economic growth paths in the medium to long term.

With regard to the paper's contribution, it is notable that, in addition to providing concrete estimates of the evolution of the ICOR for the Moldovan economy through time and comparing these estimates with the expected values of the ICOR reported in the economic literature, the paper makes a contribution by providing an analysis of the evolution of the economy's output over time in the light of the values of the calculated ICOR estimates. It furthermore uses the average value of the ICOR over a recent period to study the attainability of selected economic growth paths in the medium to long term and contrasts these results with the latest medium-term forecasts by International Financial Institutions and the Ministry of Economy and Infrastructure.

Graph 1 below depicts of the evolution of the Gross Fixed Capital Formation ratio as a share of GDP over the 1995 to 2019 period.



Graph 1. The evolution of the Gross Fixed Capital Formation ratio as a share of GDP over 1995-2019
Source: Own calculations on National Bureau of Statistics data

It is notable that the period of sustained economic growth in Moldova over the period 2000 to 2008 inclusive was accompanied by a significant increase in the Gross Fixed Capital Formation ratio as a share of GDP from 15.4 % in 2000 to around 34 % in both 2007 and 2008. As depicted in graph 1 the 2009 financial crisis was accompanied by a significant drop in the Gross Fixed Capital Formation ratio as a share of GDP to 22.6 % and the evolution of the Gross Fixed Capital Formation ratio as a share of GDP from 2010 to 2019 has hovered around its average value of 23.6 % over the 2010-2019 period.

We now turn to present estimates of the annual evolution of the ICOR calculated on the basis of the data reported in table 1 according to equation (2). We report ICOR estimates from the year 2000 onwards. It is notable that in the earlier period the annual real GDP growth rates were negative (with the exception of the 1997 estimate) and the ICOR estimates calculated on the basis of equation (2) are nonsensical.

Table 2 below depicts the evolution of the Gross Fixed Capital Formation ratio as a share of GDP (which is referred to as the investment ratio in the table) the annual real GDP growth rate and the ICOR over the period 2000 to 2009 inclusive.

Table 2

The evolution of the Gross Fixed Capital Formation as a share of GDP (I ratio) the real GDP growth rate and the ICOR over 2000-2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
I ratio (%)	15.4	16.7	16.3	18.6	21.2	24.6	28.4	34.1	34.0	22.6
GDP growth (%)	2.1	6.1	7.8	6.6	7.4	7.5	4.8	3.0	7.8	-6.0
ICOR	2.5	2.1	2.5	2.5	2.8	5.1	9.5	4.4	...	3.2

Source: National Bureau of Statistics and own calculations

The first row in the table provides the evolution of the calculated investment ratio rounded to the first decimal point. The second row provides the evolution of the estimates of the annual rate of growth of real GDP. The final row provides the annual evolution of the calculated estimates of the ICOR rounded to the first decimal point which is defined in accordance with equation (2) by the ratio of: (i) the investment ratio at time t over (ii) the rate of growth of real GDP at time $t+1$. The estimate for 2008 is not reported given that Moldova's real GDP in 2009 registered a drop.

As noted in the literature review section of this article existing empirical studies suggest that the ICOR value of an economy is likely to range between the values of 2 and 7. The range of ICOR values reported in table 2 above lie within this interval, with the single exception being the ICOR estimate for

2006 which reflects the relatively high investment ratio in 2006 (28.4 %) and the modest real growth in GDP experienced in 2007 (3.0 %).

The ICOR values for the 2000-2004 are very low and well below the value of 3. It is notable that this is not surprising as the economy in 2000 emerged from the pronounced depression over the transition period to that date. During the first few years of the 2000-2008 sustainable growth experienced in Moldova the economy operated with significant unemployed or underemployed resources due to the prolonged recession following the break-up of the Former Soviet Union up to and including the year 1999. The availability of idle resources in the economy allowed the achievement of the significant economic growth experienced over the period 2000-2008 which was associated with low values of the ICOR over the period. We should also add that the relatively low value of the ICOR for 2009 reflects the rebound of economic activity in 2010 following the significant drop in output in 2009 (-6.0 %).

Table 3 below depicts the evolution of the Gross Fixed Capital Formation ratio as a share of GDP (which is referred to as the investment ratio in the table) the annual real GDP growth rate and the ICOR over the period 2010 to 2019 inclusive.

Table 3

**The evolution of the Gross Fixed Capital Formation as a share of GDP
(I ratio) the real GDP growth rate and the ICOR over 2010-2019**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
I ratio (%)	22.5	23.2	23.6	23.0	25.9	24.3	22.2	22.3	24.3	25.2
GDP growth (%)	7.1	5.8	-0.6	9.0	5.0	-0.3	4.4	4.7	4.3	3.7
ICOR	3.9	...	2.6	4.6	...	5.5	4.7	5.2	6.6	...

Source: National Bureau of Statistics and own calculations

It is notable that the ICOR estimate for the years 2011 and 2014 is are not reported in the above table as Moldova's real GDP registered drops in 2012 and 2015. The final estimates of the National Accounts for 2020 are not yet available. However, the year 2020 is also likely to be exceptional due to the significant adverse impact of the pandemic and (to a lesser extent) the adverse impact of the drought on the economy's GDP which is expected to register a significant drop.

As noted in the literature review section of this article existing empirical studies suggest that the ICOR value of an economy is likely to range between the values of 2 and 7, with the ICOR of industrialized countries expected to lie within the range of 3 to 3.5. The paper by (Ramos et al., 2008) provided estimates of the ICOR for the Latin American countries, with the average value of the ICOR for these economies being 5.6. It is notable that all the values of the ICOR for the Moldovan economy reported in table 3 lie within the range of expected values in the economic literature. The average value over the period 2015-2018 equals 5.5 and is thus very close to the value of the ICOR for the Latin American countries reported in the paper by (Ramos et al., 2008)

As noted already in the literature review section using the estimated value of the ICOR we may generate forecasts of the GDP growth as a function of the projected investment or, alternatively, calculate the investment required in order to reach a targeted growth path.

We will calculate below the Gross Fixed Capital Formation ratio as a share of GDP which is required to reach annual growth paths of real GDP of 4%, 5 % and 6 % in the medium to long term. It should be emphasised here that an analyst should use the ICOR as an instrument to project the economy's evolution in the medium to long term. In contrast short to medium term projections should rely more on a careful assessment of current economic conditions and their likely trends in the short to medium term.

Now it is notable that the 4%, 5 % and 6 % growth paths analysed below as possible medium to long run growth scenarios are slightly more optimistic that the latest short to medium term projections of real growth for the Moldovan economy, with the 4 % scenario being closer to the short to medium term projections of the International Monetary Fund, the World Bank and the Ministry of Economy and Infrastructure of Moldova. More specifically the latest country report for Moldova of the International Monetary Fund projects the annual rate of growth of real GDP in 2021 at 4.1 %, to be followed by

annual rates of growth of real GDP equal to 3.8% per year for the years 2022 to 2025 inclusive (International Monetary Fund. European Dept., 2020). In its December 2020 economic update for Moldova the World Bank projects the annual rate of growth of real GDP in 2021 at 3.8 % and the annual rate of growth of real GDP in 2022 at 3.7 % (The World Bank, 2020). The latest forecast of Moldova's macroeconomic indicators for the years 2021-2023 published by the Ministry of Economy and Infrastructure projects the annual rate of growth of real GDP in 2021 at 4.7 % to be followed by annual rates of growth of real GDP of 4.0 % and 4.2 % in 2022 and 2023 respectively (Ministerul Economiei și Infrastructurii al Republicii Moldova, 2020).

Turning to our estimation, and given an ICOR value equal to 5.5, in order to reach an annual 4 % real growth path the required ratio of Gross Fixed Capital Formation in GDP is 22%. For an annual 5 % growth path the required investment ratio is 27.5 %, while a 6 % growth path requires an investment ratio of 33 %. We have noted above that the evolution of the Gross Fixed Capital Formation ratio as a share of GDP from 2010 to 2019 has hovered around its average value of 23.6 % over the period. Given current conditions our estimations suggest that the 4 % annual growth path is attainable. However attaining the 5 % and, especially, the 6% annual growth path would require significantly higher investment flows.

It should be emphasised here that the above-mentioned estimates imply that the average value of the ICOR for the Moldovan economy will remain constant and equal to its calculated average value. This is unlikely and the results should be taken as indicative given the current structure of the economy. Furthermore, it is worth keeping in mind that the aim of development planning is likely to be to induce an increase in the overall efficiency of the economy aiming at leading eventually to a drop of the ICOR estimate for the economy.

CONCLUSION

We now turn to discuss briefly the design of economic policy and development planning in Moldova. The design and conduct of economic policy in Moldova should aim at simultaneously:

1. Increasing investment in the economy; and
2. Inducing an increase in the overall efficiency of the economy (and the efficiency by which the factors of production combine in order to generate growth and development, thus leading to a drop in the value of the ICOR for the economy through time).

To attain the first goal mentioned above a sustained effort should be undertaken to create and maintain a stable macroeconomic and regulatory environment which is conducive to the attraction and retention of domestic and foreign investment in the economy. Of particular importance would be to strengthen the commercial banking system's intermediation which would convert the available domestic savings into productive investment. This sustained effort to create the conditions conducive to investment attraction should also include promotion policies by policy makers supported by targeted interventions, such as the activities of the "Invest Moldova" organisation.

The second goal of economic policy mentioned above should aim at designing and implementing appropriate development strategies at the macro and sectoral levels to induce sustained increases in the efficiency of the economy. Efforts towards this end will be the efficient implementation of the Association Agreement with the EU and the existing National Development Strategy "Moldova 2030", which provides the general framework for the further development of a number of sectoral development strategies as indeed is envisaged in the National Development Strategy "Moldova 2030". It is notable here that work is currently underway by the Moldovan authorities aiming at updating and optimising the sectoral strategies in various key sectors for Moldova's economic growth and development in the years to come which is likely to contribute to the attainment of Moldova's development objectives.

A natural area for further work in the future is the calculation of the ICOR of the Moldovan economy as it evolves through time given the ICOR indicator's insight into aspects of the economic growth record over time and its usefulness for simulation and forecasting purposes.

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ARTICLE HISTORY

Received 22 September 2020

Accepted 05 February 2021