MUHANDISLIK & IQTISODIYOT

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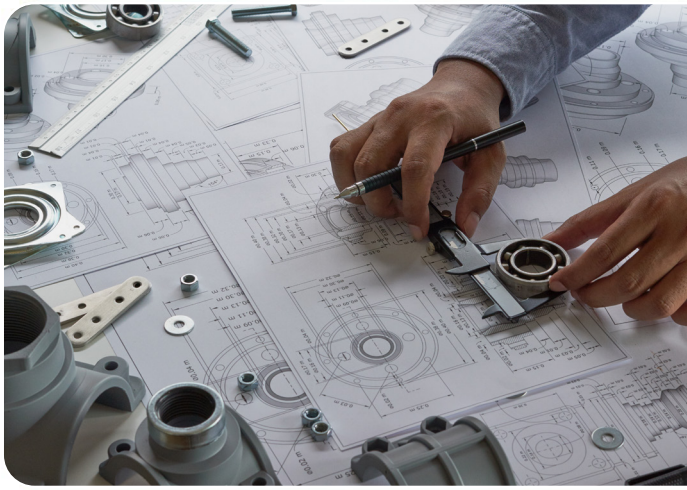
05.00.00 - Texnika fanlari
08.00.00 - Iqtisodiyot fanlar



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05.01.00 – Axborot texnologiyalari, boshqaruv va kompyuter grafikasi
05.01.01 – Muhandislik geometriyasi va kompyuter grafikasi. Audio va video texnologiyalari
05.01.02 – Tizimli tahlil, boshqaruv va axborotni qayta ishlash
05.01.03 – Informatikaning nazariy asoslari
05.01.04 – Hisoblash mashinalari, majmualari va kompyuter tarmoqlarining matematik va dasturiy ta'minoti
05.01.05 – Axborotlarni himoyalash usullari va tizimlari. Axborot xavfsizligi
05.01.06 – Hisoblash texnikasi va boshqaruv tizimlarining elementlari va qurilmalari
05.01.07 – Matematik modellashtirish
05.01.11 – Raqamli texnologiyalar va sun'iy intellekt
05.02.00 – Mashinasozlik va mashinashunoslik
05.02.08 – Yer usti majmualari va uchish apparatlari
05.03.02 – Metrologiya va metrologiya ta'minoti
05.04.01 – Telekommunikasiya va kompyuter tizimlari, telekommunikasiya tarmoqlari va qurilmalari. Axborotlarni taqsimlash
05.05.03 – Yorug'lik texnikasi. Maxsus yoritish texnologiyasi
05.05.05 – Issiqlik texnikasining nazariy asoslari
05.05.06 – Qayta tiklanadigan energiya turlari asosidagi energiya qurilmalari
05.06.01 – To'qimachilik va yengil sanoat ishlab chiqarishlari materialshunosligi
05.08.03 – Temir yo'l transportini ishlatish
05.09.01 – Qurilish konstruksiyalari, bino va inshootlar
05.09.04 – Suv ta'minoti. Kanalizatsiya. Suv havzalarini muhofazalovchi qurilish tizimlari
10.00.06 – Qiyosiy adabiyotshunoslik, chog'ishtirma tilshunoslik va tarjimashunoslik
10.00.04 – Yevropa, Amerika va Avstraliya xalqlari tili va adabiyoti
08.00.01 – Iqtisodiyot nazariyasi
08.00.02 – Makroiqtisodiyot
08.00.03 – Sanoat iqtisodiyoti
08.00.04 – Qishloq xo'jaligi iqtisodiyoti
08.00.05 – Xizmat ko'rsatish tarmoqlari iqtisodiyoti
08.00.06 – Ekonometrika va statistika
08.00.07 – Moliya, pul muomalasi va kredit
08.00.08 – Buxgalteriya hisobi, iqtisodiy tahlil va audit
08.00.09 – Jahon iqtisodiyoti
08.00.10 – Demografiya. Mehnat iqtisodiyoti
08.00.11 – Marketing
08.00.12 – Mintaqaviy iqtisodiyot
08.00.13 – Menejment
08.00.14 – Iqtisodiyotda axborot tizimlari va texnologiyalari
08.00.15 – Tadbirkorlik va kichik biznes iqtisodiyoti
08.00.16 – Raqamli iqtisodiyot va xalqaro raqamli integratsiya
08.00.17 – Turizm va mehmonxona faoliyati

Ma'lumot uchun, OAK Rayosatining 2024-yil 28-avgustdagi 360/5-son qarori bilan "Dissertatsiyalar asosiy ilmiy natijalarini chop etishga tavsiya etilgan milliy ilmiy nashrlar ro'yxati"ga texnika va iqtisodiyot fanlari bo'yicha "Muhandislik va iqtisodiyot" jurnali ro'yxatga kiritilgan.

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MUNDARIJA • СОДЕРЖАНИЕ • CONTENTS

MUNDARIJA

POTENTIAL GDP ESTIMATION AND OUTPUT GAPS IN EMERGING ECONOMIES: A COMPARATIVE REVIEW

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Abstract: Estimating potential GDP and output gaps in emerging economies is particularly difficult due to limited data, structural issues, and external shocks that hinder accurate measurement. This paper combines evidence from Romania, Ethiopia, Moldova, and Saudi Arabia's non-oil sector to assess the effectiveness of statistical filters, production functions, and various multivariate or hybrid methods. Research shows that crises have a more profound and lasting impact on potential output in developing countries. Structural issues like labor migration, weak institutions, and reliance on commodities increase these vulnerabilities. Romania's multivariate models, Ethiopia's ARDL framework, and Moldova's diverse methods showcase both creativity and challenges in estimating emerging economies. Saudi Arabia's non-oil growth shows strong resilience amid its diversification efforts. The review finds that although simple methods offer useful benchmarks, multivariate and hybrid approaches yield more dependable policy signals. Enhancing data systems, promoting transparency, and tailoring approaches to fit institutional contexts are vital for credible and sustainable growth in emerging economies.

Keywords: Potential GDP, Output gap, Emerging economies, Statistical filters, Production function, Multivariate and hybrid models, Economic crises, Structural reforms, Data limitations, Fiscal and monetary policy in developing countries.

Annotatsiya: Rivojlanayotgan mamlakatlarda potensial YaIM va ishlab chiqarish bo‘shlig‘ini baholash aniq o‘lchovlarni qiyinlashtiruvchi ma’lumotlarning cheklanganligi, tarkibiy muammolar hamda tashqi zarbalar tufayli ayniqsa murakkabdir. Ushbu maqola Ruminiya, Efiopiya, Moldova va Saudiya Arabistonining neftga taalluqli bo‘lmagan sektori bo‘yicha dalillarni birlashtirib, statistik filtrlardan, ishlab chiqarish funksiyalaridan va turli multivariat yoki gibrid usullardan foydalanish samaradorligini baholaydi. Tadqiqotlar ko‘rsatadiki, inqirozlar rivojlanayotgan mamlakatlarda potensial ishlab chiqarishga yanada chuqur va uzoq muddatli ta’sir ko‘rsatadi. Mehnat migratsiyasi, zaif institutlar va xomashyo mahsulotlariga tayanish kabi tarkibiy muammolar ushbu zaifliklarni kuchaytiradi. Ruminiyaning multivariat modellaridan, Efiopiyaning ARDL yondashuvlaridan va Moldovaning turli usullaridan foydalanish rivojlanayotgan mamlakatlarda baholashdagi ijodkorlik va qiyinchiliklarni namoyish etadi. Saudiya Arabistonining neftga taalluqli bo‘lmagan sektori esa diversifikatsiya siyosati doirasida barqaror o‘sishni ko‘rsatadi. Tahlil shuni ko‘rsatadiki, oddiy usullar foydali ko‘rsatkichlarni bersa-da, multivariat va gibrid yondashuvlar yanada ishonchli siyosiy signallar beradi. Ma’lumotlar tizimini yaxshilash, shaffoflikni oshirish va yondashuvlarni institutsional sharoitlarga moslashtirish rivojlanayotgan mamlakatlarda ishonchli va barqaror o‘sish uchun muhim hisoblanadi.

Kalit so‘zlar: Potensial YaIM, Ishlab chiqarish bo‘shlig‘i, Rivojlanayotgan mamlakatlar, Statistik filtrlash, Ishlab chiqarish funksiyasi, Multivariat va gibrid modellar, Iqtisodiy inqirozlar, Tarkibiy islohotlar, Ma’lumotlar cheklanganligi, Rivojlanayotgan mamlakatlarda fiskal va monetar siyosat.

Аннотация: Оценка потенциального ВВП и разрыва выпуска в развивающихся экономиках особенно затруднена из-за ограниченности данных, структурных проблем и внешних шоков, препятствующих точным измерениям. В данной статье объединяются данные из Румынии, Эфиопии, Молдовы и не нефтяного сектора Саудовской Аравии для анализа эффективности статистических фильтров, производственных функций и различных многомерных или гибридных методов. Исследования показывают, что кризисы оказывают более глубокое и долговременное воздействие на потенциальный выпуск в развивающихся странах. Структурные проблемы, такие как миграция рабочей силы, слабые институты и зависимость от сырьевых товаров, усиливают эти уязвимости. Примеры использования многомерных моделей Румынии, ARDL-подхода Эфиопии и разнообразных методов Молдовы демонстрируют как креативность, так и трудности в оценке развивающихся экономик. Рост не нефтяного сектора Саудовской Аравии свидетельствует о высокой устойчивости в условиях диверсификации. Обзор показывает, что, хотя простые методы предоставляют полезные ориентиры, многомерные и гибридные подходы дают более надежные сигналы для политики. Совершенствование статистических систем, повышение прозрачности и адаптация методов к институциональному контексту являются ключевыми условиями для обеспечения достоверного и устойчивого роста в развивающихся странах.

Ключевые слова: Потенциальный ВВП, Разрыв выпуска, Развивающиеся экономики, Статистические фильтры, Производственная функция, Многомерные и гибридные модели, Экономические кризисы, Структурные реформы, Ограниченность данных, Фискальная и монетарная политика в развивающихся странах

INTRODUCTION

In emerging economies, potential GDP and the output gap are essential for grasping sustainable growth, controlling inflation, and shaping fiscal policies. These countries encounter distinct challenges, including limited statistical capacity, unstable external conditions, and structural issues like labor migration or reliance on a single sector. The 2008 financial crisis and the COVID-19 pandemic have significantly impacted potential growth in Romania, Ethiopia, and Moldova. In contrast, Saudi Arabia's efforts to diversify its non-oil sector demonstrate resilience. Estimation methods differ, including Hodrick–Prescott filters, Cobb–Douglas production functions, and multivariate Bayesian and ARDL models, but their effectiveness largely relies on the quality of data and the strength of institutions. This paper reviews experiences from emerging economies, examining various methods for measuring potential GDP and output gaps, the structural and external factors influencing these results, and the policy implications for enhancing resilience and credibility in developing contexts.

LITERATURE REVIEW ON THE TOPIC

Estimating potential GDP and the output gap is crucial for emerging economies, as these indicators inform fiscal sustainability, inflation control, and long-term development plans. Potential GDP indicates the sustainable output level, and the output gap reflects cyclical pressures. Estimating in data-limited settings is challenging, as scarce information on capital, labor, and productivity makes empirical analysis more complex (Ernst, 2005; Wondemu & Potts, 2016).

Statistical filters are widely used in emerging economies because they are straightforward. The HP filter was used on Romania, Ethiopia, and Moldova to create trend-cycle decompositions of GDP (Armeanu et al., 2015; Ernst, 2005). The Kalman filter offers flexibility, like in Ethiopia, but needs precise calibration. While these methods face criticism for confusing structural changes with cyclical variations, they are still essential in environments with limited data.

Production function methods provide valuable insights, yet require more robust data. Before the crisis, Romania's growth was fueled by capital inflows, but the aftermath has diminished its potential (Armeanu et al., 2015; Mihai & Bozagiu, 2025). Saudi Arabia's non-oil sector demonstrates consistent performance, with expected growth of 5–6 percent, even amid oil market fluctuations (Alkhareif & Alsadoun, 2016). Moldova illustrates the difficulties faced by transition economies, where fragile institutions and labor migration hinder potential output (Ernst, 2005).

Multivariate and hybrid models are particularly useful in new situations. Romania's Bayesian multivariate framework combines inflation and unemployment, providing more relevant insights for policy (Mihai & Bozagiu, 2025). Ethiopia's ARDL approach connects output gaps to factors like trade openness, foreign investment, and inflation, illustrating the interaction between structural and external shocks and potential output (Wondemu & Potts, 2016).

Insights from emerging economies reveal important lessons. Romania shows both its vulnerability to external shocks and its resilience, especially through EU integration. Ethiopia highlights the need for transparency and investment, while also pointing out the disruptive impact of inflation. Saudi Arabia's non-oil economy highlights the importance of breaking down sectors, whereas Moldova focuses on challenges related to institutions and the labor market.

Crises have a profound impact on emerging economies. After the 2008 crisis and during the COVID-19 downturn, Romania's potential GDP declined. Ethiopia's openness made it vulnerable to volatility, while Moldova's weak institutions heightened the impact of external shocks. These cases show that crises significantly lower potential GDP in developing economies, leading to slow recovery paths.

The implications for policy are evident. Emerging economies require reforms in structure, flexibility in labor markets, enhanced capital measurement, and stronger statistical capabilities. Using multivariate and hybrid methods leads to more reliable estimates of the output gap. Policymakers should view estimates as flexible guides that need regular updates, not as rigid benchmarks.

Evidence from emerging economies indicates that although data limitations necessitate simple methods, hybrid and multivariate approaches yield more valuable insights. Crises leave enduring impacts on potential GDP, while structural issues like labor migration, weak institutions, and resource dependence increase vulnerabilities. Developing countries need to enhance their data systems and implement strong methods to ensure reliable macroeconomic policy..

RESEARCH METHODOLOGY

Emerging economies encounter distinct difficulties in assessing potential GDP and output gaps, primarily due to data limitations, structural volatility, and external shocks. The methods employed in these contexts modify general strategies to address data shortages and institutional challenges.

Statistical filters serve as valuable tools in settings with limited data. In Romania, Ethiopia, and Moldova, the HP filter has been used to derive potential GDP from observed data (Armeanu et al., 2015; Wondemu & Potts, 2016; Ernst, 2005). The Kalman filter, while more complex, has been utilized with HP in Ethiopia and Saudi Arabia's non-oil sector to account for random variations. These methods, though straightforward, may mistakenly identify structural shifts as cyclical movements, a frequent issue in emerging economies.

Production function approaches offer a clearer framework by breaking down growth into contributions from capital, labor, and total factor productivity (TFP). Romania used this method to illustrate growth driven by capital before the crisis and the lasting effects afterward (Mihai & Bozagiu, 2025). The performance of Saudi Arabia's non-oil sector highlights the strength of its diverse growth avenues, showing a steady potential growth rate of 5–6 percent (Alkhareif & Alsadoun, 2016). Moldova illustrates the challenges faced by transition economies, marked by incomplete capital data and the impact of labor migration on productivity (Ernst, 2005).

Multivariate and hybrid models hold great potential for developing economies. Romania used a multivariate filter that included inflation and unemployment, with Bayesian enhancements to strengthen its reliability (Mihai & Bozagiu, 2025). Ethiopia used an ARDL framework to link output gaps with key factors such as trade openness, FDI, and inflation (Wondemu & Potts, 2016). These methods provide estimates that align more closely with macroeconomic conditions, leading to improved policy recommendations.

Adjustments tailored to each country reveal a range of unique challenges. Saudi Arabia's efforts to reduce reliance on oil are tackling the distortions caused by this dependence. Moldova used a mix of filters and inventory methods to address its data challenges. Romania's entry into the EU demanded approaches that were mindful of integration challenges. Ethiopia used hybrid models to connect structural factors and external influences on potential output.

Lessons from emerging economies show that there isn't a one-size-fits-all approach. Basic filters offer useful estimates but may lack precision; production functions uncover growth drivers but depend on limited data; multivariate and hybrid models enhance realism but require meticulous calibration.

In emerging economies, methodological practices have shifted from basic filters to more complex multivariate and hybrid models, highlighting data limitations and the increasing demand for relevant policy estimates. In developing contexts, the most reliable results emerge from using multiple methods and adapting approaches to fit the specific structural and institutional realities.

ANALYSIS AND RESULTS

Evidence from emerging economies shows that potential GDP is particularly sensitive to external shocks, structural issues, and methodological decisions. Romania illustrates that using multivariate filters that include inflation and unemployment yields more accurate output-gap estimates than relying solely on the HP filter. This approach better captures significant downturns and the connections between inflation and labor-market slack (Armeanu et al., 2015; Mihai & Bozagiu, 2025). Romania's journey highlights the lasting impact of the 2008 financial crisis and the COVID-19 pandemic, both of which significantly diminished potential GDP. Policy support played a crucial role in the economic rebound, demonstrating that timely interventions can ease cyclical fluctuations despite ongoing structural challenges. Ethiopia shows how transparency and investment influence sustainable GDP growth. Wondemu & Potts (2016) used ARDL models to show that trade openness and FDI enhance potential output, whereas inflation and financial volatility hinder it. This highlights the impact of macroeconomic stability and external integration on potential growth in low-income, agrarian economies. Moldova emphasizes the institutional hurdles encountered by transition economies. Weak governance, labor migration, and inadequate capital measurement lead to uncertain estimates, often necessitating a mix of HP filtering and inventory methods (Ernst, 2005). These structural weaknesses amplify the lasting impacts of crises and hinder sustainable growth. The non-oil sector in Saudi Arabia showcases resilience in resource-dependent economies. Non-oil potential growth averaged 5–6 percent across various methods, indicating that diversification and investment can support long-term capacity despite fluctuations in the oil market (Alkhareif & Alsadoun, 2016). Methodological adjustments, such as separating oil from non-oil activities, are crucial for reliable estimates in resource economies. Collectively, evidence from emerging economies demonstrates three key points. Crises and structural weaknesses significantly lower potential GDP in developing countries. Methodological choices significantly influence results; using multivariate and hybrid models enhances policy relevance, especially in data-limited contexts. Third, reforms, openness, and diversification are essential for rebuilding and maintaining growth potential. These findings show that, despite inherent uncertainties, strong and tailored methods can equip governments with practical tools for effective policy design.

CONCLUSION AND SUGGESTIONS

Evidence indicates that for emerging economies, estimating potential GDP and output gaps is more challenging and urgent compared to advanced economies. The global financial crisis and the COVID-19 pandemic significantly impacted Romania and Ethiopia, while Moldova faced challenges due to institutional weaknesses and labor migration, limiting its growth potential (Măntescu & Lazăr, 2014; Mihai & Bozagiu, 2025; Wondemu & Potts, 2016). In these situations, recovery takes longer and vulnerabilities linger, highlighting the fragility of potential GDP in developing economies. In contrast, Saudi Arabia's non-oil sector shows that diversification and ongoing investment can enhance resilience to external shocks (Alkhareif & Alsadoun, 2016). Emerging economies highlight the shortcomings of simplistic methods and the benefits of hybrid approaches. HP and Kalman filters are widely used in data-limited settings, yet they frequently confuse structural changes with cyclical variations. Production functions provide valuable insights, yet they are limited by gaps in capital and labor data, as evidenced in Moldova. Multivariate and hybrid models, like Romania's Bayesian frameworks and Ethiopia's ARDL models, offer greater reliability by incorporating factors such as inflation, unemployment, openness, and investment into their estimation processes (Mihai & Bozagiu, 2025; Wondemu & Potts, 2016). Context is crucial in drawing comparisons. The outcomes of estimations are influenced by data quality, the strength of institutions, and structural dependence. Emerging economies need to enhance their statistical capacity, refine labor and capital measurements, and utilize structure-aware multivariate models to achieve reliable estimates. In summary, potential GDP in emerging economies is best viewed as a dynamic estimate, not a static number. Policymakers should tailor their methods to fit local contexts, regularly refresh them with new data, and apply these insights to shape fiscal and monetary strategies. Building strong institutions, promoting transparency, and diversifying economies are essential for reducing vulnerability and achieving sustainable growth over the long term.

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