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# The impact of global trade on the economic development of Maghreb nations

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In this research, the impact of global trade on the economic development of Maghreb nations is examined. The model definition was based on the modified Solow growth model (1956) utilized by Mankiw et al. (1992). From 1996 to 2016, the system generalized method of moments (GMM) was applied to a panel of Maghreb nations. The findings show that the human capital index, gross fixed capital formation, and international trade all have a negative and substantial impact on the Maghreb's economic growth. The findings further demonstrate that the observed economic convergence is conditional rather than absolute. This indicates that the Maghreb region's existing level of foreign commerce is not a reliable source of economic growth.

The study's recommendations for economic policy include increasing exports that are expected to foster growth circumstances and enhancing the productive system to increase trade participation.

## Overview

One of the main goals of economic researchers has always been to understand the variables that affect economic growth in a particular economy. Among these elements is international commerce, since mercantilist doctrines. The majority of theoretical literature on growth and international trade claims that trade increases economic growth in the long term. The prevailing theoretical perspective holds that economies that engage in greater international trade and are thus open grow more quickly than economies that are closed (Clare Beckett, 2005; Josh Ederington & Jenny Minier 2008 ). Ever then, among the several drivers of productivity and expansion, trade internationally has been seen as a significant influence. Its weight in economic activity determines how much it contributes.

An key finding in this regard is that nations that trade internationally typically have higher levels of productivity than their comparatively closed equivalents that manufacture goods exclusively for the domestic market. Additionally, trade across borders promotes resource efficiency and can accelerate growth, leading to a greater accumulation of factors, especially in nations with advanced levels of technological diffusion and knowledge (Rita Almeida, 2008; Yu Xie (1992); Barro, R. J. and X. Sala-i-Martin) (1995).

There are still disagreements in the discussions on this topic, despite the initial works' conclusions

supporting the beneficial impact of global commerce on economic growth. In fact, some rather gloomy writers claim that trade internationally may negatively impact economic expansion (Robert Jr 1999).

From there, conclusions regarding the relationship between growth and international trade shift from being purely theoretical to being more empirical. The argument is still being discussed, and different authors and industrialized versus developing countries will certainly reach different results. Nonetheless, there is evidence that nations are still working toward trade liberalization and active involvement in international commerce in the hopes of seeing economic progress in their own economies.The Maghreb is a group of West African countries that form a regional trading bloc. The region's goal of competitiveness and well-being places a premium on both regional and international trade, and to achieve this goal, each member state implements trade policies at the national, regional, and international levels in favor of increased commercial openness. For example, all of the Maghreb's member states are members of the World Trade Organization (WTO), are working to strengthen their regional integration process through increased trade liberalization within their borders, and are implementing other trade agreements. Nevertheless, the effects of these nations' participation in international trade on their economies are still uneven.The region's economy is growing slowly and in an uncertain manner as the economic situation continues to evolve. In fact, West African economic growth slowed down in 2015, coming in at 4.2% as opposed to 6.1% in 2014. The Maghreb's heavy reliance on the export of raw materials — oil in particular — is a sign of the weakness of the foundations supporting these nations' economic progress. This explains why activity has slowed down in the majority of Maghreb nations (UNECA, 2016). Furthermore, notable differences are noted in the growth rates of the Maghreb member nations. This raises numerous concerns about the degree of economic convergence in the Maghreb region.

Numerous empirical studies have also examined the connection between global trade and economic expansion. However, like with the ideas around the topic, the Empirical results are not entirely clear. International commerce and economic growth have been found by several authors to be positively correlated (H. and Yang, W.-Y. 2009; Kumar, 2015; Butler, 2011).

Some writers get to the conclusion that the two ideas have nothing to do with one another (acob W. & Yiheyis, 2015; Zelealem, 2015). The disparity in the approaches taken and the indicators of international trade may be the cause of the empirical results' variability (Albert,2016; MLT Nguyen, 2016). Sub-Saharan African developing nations have been the subject of some research (Bülent, 2013; H. and Yang, W.-Y., 2016; Zelealem, 2016).

The majority of this studies shows that there is a positive correlation between economic growth in the participating nations and international commerce. The great majority of writers concur that earlier research on the connection between growth and international trade was flawed in terms of methodology (South, E. I., 1993). The majority of studies conducted in the Maghreb employed panels, despite the fact that relatively few of them focused on the region as a whole. Nonetheless, as noted by Sadiku and Petkovski (2015), the prior GDP level would be a useful explanatory indicator of the trade-growth relationship. This explains why a dynamic panel was used in this paper.

**Some stylized facts about trade and economic growth in the Maghreb zone**

We note that the economic growth rate for all Maghreb countries has improved relatively, but when we look at performance by country, the situation appears more or less mixed. One of the stated goals of this commitment to liberalization is the short, medium, and long term improvement in the standards of living and well-being of peoples, notably through strong and sustainable economic growth.

The average GDP growth rates per capita of the Maghreb member states are shown in the graph

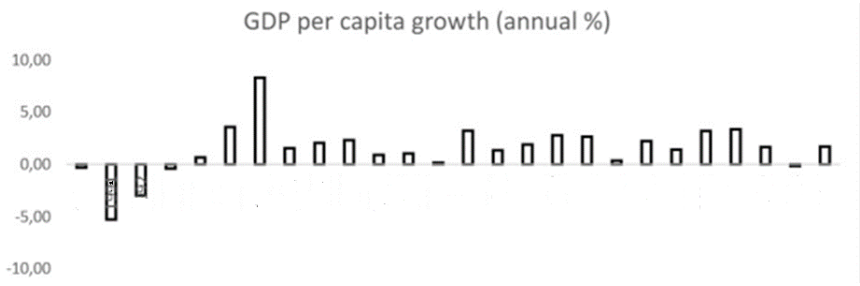


**Figure 1.** Evolution of growth rates of average GDP per capita in the Maghreb.

above as they have changed from 2000 to 2024. Several parts of this graph deserve attention based on the analysis. First, from 2000 to 2024, the GDP per capita growth rates in the Maghreb region were negative on average, reaching a negative peak of 5.28% in 2000. The area's declining economic performance may be explained by the crisis's ongoing effects and the fragility of the political systems that have ruled these nations since their independence. The majority of the Maghreb's developing nations saw their economic conditions worsen as a result of the economic crisis, which also contributed to imbalances in macroeconomic aggregates.

Furthermore, most Maghreb governments have been locked in extremely unstable political situations — either successive coups d'état or dictatorial and authoritarian regimes — since the exhilaration of the years of independence. The economic situation has gotten worse as a result of these unpredictable circumstances, which have blocked economic activity.

Additionally, the shift in the political-economic regime and the lengthening of the learning process may account for the weak economic performance in terms of the per capita economic growth rate between 2000 and 2024. In fact, nations have chosen economic liberalism and democracy, guided by the Bretton Woods institutions, to mitigate the crisis's adverse effects. Consequently, we witnessed an initial deepening of the imbalance at the outset of these significant developments, which amply explains the negative GDP per capita growth rates during this time.

Beyond this time frame, the GDP per capita of the Maghreb has grown at a strictly positive pace, reaching a peak of 8.30% in 2000, with the exception of 2014. This demonstrates how the economies of the Maghreb Member States have recovered as a result of the numerous investment structuring options and the reforms implemented in the majority of the countries. In this

In comparison, the GDP per capita growth rate typically ranges from 2 to 3% throughout other times. Nonetheless, the detrimental effects of the crisis — first financial, then economic — affected the Maghreb's economic performance, resulting in a decline in GDP per capita growth from 2.65% in 2017 to 0.36% in 2018. Even after the rebound, the community's per capita growth rate decreased, reaching -0.16% in 2014 as a result of the oil price decline that negatively impacts Nigeria, a “big” in space. However, the trend line indicates a modest and steady increase in this rate over the years 2000–2024, notwithstanding variations in the GDP per capita growth rate. Thus, if the countries are considered separately, the economic measures implemented greatly raise the standard of living for the Maghreb's citizens.

The graph below displays the GDP per capita for the Maghreb countries as a simple average for the years 2000–2022. The stark disparities between the GDP per capita of the Maghreb's nations show how different their degrees of development are from one another. Some have been assimilated into the Maghreb process more thoroughly than others. For instance, the Maghreb nations, who already use the same currency, have been implementing the Common External Tariff (CET) since 2000. This graph also shows that the


**Figure 2.** Gross domestic product per capita by country.

GDP per capita in the Maghreb countries can be explained by some degree of regional variability. Despite working toward regional integration since its founding in 1975, the SLEC's implementation in 2000 represents a fundamental policy in favor of intra-zone trade.The scope of products covered by this scheme was expanded in 2013 with the revision of the SLEC. The implementation of the Maghreb TEC in 2015 has facilitated the acceleration of international trade by extending the regional integration process.

It's also important to recognize the WAEMU nations' dedication to this similar procedure. The countries in the Maghreb still have comparatively low levels of their share in foreign trade, despite the region's goal to raise its level of regional and worldwide trade.

**Literature Review**

In 1776, Smith claimed in The Wealth of Nations that trade between nations has a favorable impact on the economy as a whole. Free trade and free international competition are supported by the Smithian notion of international trade. He believes that liberalism is good for economies.

Many researchers and economists started examining the potential connections between global trade and economic expansion after Smith. In the 1960s, the pursuit of improved well-being and the realization of economic goals — particularly long-term, sustainable economic growth — occupied the minds of decision-makers.

The dilemma of whether a nation should adopt policies encouraging both imports and exports or concentrate on one of the two in order to positively effect growth is one that is theoretically acknowledged as a significant variable in economic growth. Since the end of World War II, the conundrum of deciding on the best trade policy has been and continues to be a major concern. Until recently, research on the connection between trade liberalization and economic growth was done using Heckscher-Ohlin (1977) and Ricardo (1817)'s classic model.

This paradigm states that increased output follows opening up to global trade. This is because the nation is currently allocating its resources more effectively based on the concept of comparative advantages following its opening to commerce. According to the neoclassical growth model, technological advancement is an exogenous element that determines the long-term growth rate of GDP per capita. This model states that a rise in the savings rate causes a brief rise in the growth rate.

Trade openness may affect the long-term growth rate in the neoclassical setting if it results in a technological stimulus. But as (Eriș and Ulașan, 2013) point out, neither the neoclassical model of growth nor the conventional Ricardo-Heckscher-Ohlin model offer a coherent and clear theoretical framework supporting the claim that trade opening or even liberalization promotes technological advancement.

The effects of trade openness on growth, especially over the long run, have recently come into sharper focus in theories of endogenous growth. A theoretical framework connecting trade policy and long-term economic growth is provided by the models of Grossman and Helpman (1993) and Rivera-Batiz and Romer (1991), among others.

Aspects of empirical research: Since the early

1980s, scholars and economists from all over the world have developed an interest in the ways that trade openness and its constituent parts affect economic growth. One of the earliest works to discuss the subject of how commerce affects economic growth was (Balassa, 1965). The author set out to investigate the theory that states nations that prioritize exports outperform those that pursue import substitution strategies in terms of economic growth. The relationship between the growth of exports and the increase of the gross national product (GNP) net of exports was also looked at by the author. This correlation represents the indirect effects of exports through income and associated costs, providing an understanding of the overall influence of exports on economic growth.

Based on a large body of research, including studies by Collier (1992) and Martin R (1993) as well as empirical research by Avi Maayan et al (1995), it is widely acknowledged that trade liberalization, commercial opening, or international commerce promotes growth. For his part, (Martin R, 2005) made an effort to quantify the link between increased productivity and trade liberalization. It comes to the conclusion that factor growth and trade liberalization indicators are strongly correlated. The author's methodological contribution to the discussion of trade liberalization and economic growth is the key point of contention. In fact, according to (Martin R , 2005), the use of unrelated liberalization metrics in conjunction with a dearth of data for cross-country comparison research could account for the inconsistent outcomes... (Rodriguez and Rodrik, 1999) has made a substantial contribution to this field.

In order to explain expansion, the writers are interested in the geographic features of the nation. They contend that significant data regarding the volume and nature of both domestic and international trade can be found in geographic features. (EFFREY A 2005) support the positive impact of trade on income from both international and intra-country trade, based on estimates of the influence of trade on instrumental variables. The writers also looked at whether big nations — like the United States — trade more than small nations. They get to the conclusion that big countries45 seem to have lower trade-to-GDP ratios than the same ratios in smaller countries because of the abundance of trade opportunities in their regions.

In a similar vein, (Collier et al., 2004) examined the body of research on trade liberalization and economic growth and came to the conclusion that the former fosters the latter. He was also interested in the relationship between growth and trade liberalization as it relates to other policies being put in place, particularly the fight against corruption. Trade liberalization with other countries can lessen this occurrence. According to Wijeweera et al. (2016), nations with higher levels of commerce with foreign markets are likely to have their institutions subject to increased scrutiny. In order to satisfy the expectations of foreign investors, (Samuel Rustandi, 2000) has already recommended and supported increased operational transparency. These theories outline the potential pathways through which trade openness could eventually result in economic expansion.

A deluge of criticism greeted most research conducted in the 1980s and 1990s exploring the potential impact of trade liberalization on GDP. For the sake of illustration, (Necklace, 1993) views trade liberalization's effect on growth with skepticism. The author makes the case that a large portion of earlier research employed faulty techniques devoid of a clear, concise, and analytical framework. Moreover, the process of trade liberalization is still reliant on definitional and conceptual discrepancies across all facets of the activity; this poses a significant challenge to the development of consolidated and trustworthy measuring indicators of trade distortions (Collier, 1993). In this regard, Charles I. Jones's work from 2000 is most likely the most frequently mentioned. Following the skeptic empirical study's conclusion that trade liberalization and economic growth are not conclusively correlated, the authors offer a critical analysis of the literature already available on the topic. For example, they criticize the work of Edwards

(2015), who similarly examined the relationship between openness and growth using nine (09) alternative indicators of commercial liberalization, and conclude that a robust relationship between openness and growth was not found.

These ideas suggest that trade liberalization offers four key opportunities that are likely to contribute positively to long-term economic growth: Effects of communication, integration, and resource distribution.

Numerous additional works have been refuted by them (Kornai, 1993; Heston and Aten, 2008). Various explanations are given as justifications, including faulty index creation, imprecise data, insufficient measurement time frames, subjectivity in the research, and associations with other non-market variables like size and location. They draw the conclusion from their research on the subject that the idea that trade liberalization policies automatically result in economic growth is not well supported by the available data. In their well-known work, Heston and Aten (2000) criticized the use of liberalization indicators, which they claimed were correlated with other causes of subpar economic performance rather than being specifically related to trade, as well as econometric analysis, which they called weak and unreliable.

In response to this critique, a number of other authors introduced more variables and tried figuring out how they affected growth (Semančíková, 2016). Regarding the matter, Sala-i-Martin (1992) highlighted that all growth policies have a strong correlation with one another. As a result, if all economic policy factors were included in the study, it would be challenging to assess each one's impact separately while also being simple to identify the impact of institutional and economic policy variables that were left out of trade. In response to these critiques, (Douglas A. & Marko, 2002) employed the 2SLS approach to reexamine the findings of (Frankel and Romer, 1999) while accounting for a few more 20th-century eras. They conclude that the data were strong enough to different time periods.

Furthermore, comparing the 2SLS estimator's coefficient to the marginal significance found by Hildegunn Kyvik Nordås (1999), it was shown to be significant at the conventional level.

However, the robustness of the results is adversely affected by the addition of other geographic variables, such as latitude. Moreover, it was demonstrated that the OLS estimate understated the true impact of trade on income (Hildegunn Kyvik Nordås, 1999; Markusen, J.R. and A.J. Venables, 2002) following a minor methodology adjustment. Tenreyro et al. (2008), for their part, conducted an empirical investigation of the connection between trade liberalization and economic expansion. They contend that research on this topic, both theoretical and empirical, has produced conclusions that, as of yet, remain unresolved. For them, the diversity of results obtained could be due to the In light of these circumstances, (Daniel W et al., 2008) came to the conclusion that drawing generalizations about trade liberalization and its effects on growth rates should only be done very cautiously and subjectively from their own data. Based on the research of (Greenway, 2012), (Collier, 2004) investigated the impacts of trade liberalization on growth, focusing on developed nations like those in the OECD and developing nations like Singapore, Malaysia, Korea, etc. They selected one-third (1/3) of emerging nations due to the rise in the proportion of trade in GDP at constant prices over the previous 20 years, the decrease in tariffs, and the steady improvement in these nations' economic .The findings demonstrated a robust relationship between changes in the volume of commerce and fluctuations in growth over a ten-year period. As for them, (Helmpen E, 2008) used a new database on trade liberalization and openness indices to continue the work of Jeffrey D. and Andrew D (1995). The findings confirm that trade liberalization has a favorable and significant impact on economic growth.

The long-term relationship between trade, trade liberalization, and economic growth in nations that have experienced high levels of trade openness has been the fundamental subject of various empir-

ical studies conducted recently. These comprise developing nations as well as those in Asia, Latin America, the Maghreb, and transitional states. For instance, Collier (2008) used panel data for 35 less developed nations, including those in East Asia, to examine the relationship between trade openness and economic growth. Based on the findings, he draws the conclusion that, with the exception of the middle-income nations, there is not, over the long run, a favorable association between liberalization and growth for a large number of countries.

In order to test the "Trade-Growth" hypothesis, (Warner et al., 2010) used the quantile regression approach. They came to the conclusion that openness has greater long- and short-term effects on growth in low-growth countries than it does in high-growth countries. Additionally, (Sachs and Warner 2012) examined the impact of trade openness on economic growth for Maghreb nations using instrumental factors on panel data. Based on the authors' estimates, trade liberalization has resulted in both short- and long-term growth for the nations involved.

Accordingly, the literature on the connection between global trade and the economic crossing differs from that on the imperial plan's initial design. This also has to do with a range of user indicators, methodological applications for employees, and pay-related aspects.

**Methdos**

This study's data span the years 2000–2021 and include a slightly non-cylindrical panel of Maghreb nations. The 2000–2021 study period is constrained by the data availability for this group of nations. The World Bank's World Development Indicators (WDI) database is the main source of statistics.

This study's data span the years 2000–2021 and include a slightly non-cylindrical panel of Maghreb nations. The study period, which runs from 2000 to 2021, is limited by the data available for this group of nations. The World Bank's World Development Indicators (WDI) database is the main source of statistics.

We provide a growth equation first introduced by Robert Merton in 1965 and also the expanded version utilized by Romer D., taking into account the traditional growth literature. The following equation represents economic growth (as indicated by real GDP per capita) and the variables that influence growth but change over time and space (countries).

$$\ln Y_i = \beta_0 + \gamma \ln Y_i - 1 + \beta' \ln X_{i,t} + \lambda_i + \mu_t + \varepsilon_{i,t}$$

The logarithm of the real GDP per capita (in current US dollars) of country i in year t is represented by $\ln Y_{i,t}$ in equation (1) above; The initial GDP per capita is denoted by $Y_{i,t-1}$; the vector of explanatory variables (determinants of growth) varies in time and space and is defined by the augmented Solow growth model; the error term is $\varepsilon_{i,t}$; the unobserved country specific effect is $\lambda_i$; the unobserved specific effect of time that captures the overall shocks is $\varepsilon_{i,t}$. The econometric model that assesses the impact of foreign trade on economic growth for the Maghreb nations could be expressed as follows, in accordance with Sadiku & Petkovski et al. (2015):

$$\ln Y_{i,t} = \alpha_0 + \alpha_1 Y_{i,t-1} + \alpha_2 \ln\ tr_{i,t} + \alpha_3(\ln\ tr_{i,t} \cdot \ln Y_{i,t-1}) + \alpha_4 \ln hci_{i,t} + \alpha_5 \ln gfcf_{i,t} + \alpha_6 \ln fdi_{i,t} + \lambda_i + \mu_t + \varepsilon_{i,t}$$

The logarithm of country I's GDP per capita at the beginning of each period (GDP per capita, initial level) approximates the initial capital stock. The coefficient of this variable is presumed to be negative and significant under the convergence conditional hypothesis (Barro and Lee, 1995; Robert Merton, 1956). Assuming all else is equal, we predict that the GDP per capita of nations will increase more quickly than that of nations with lower GDP per capita.

The trade ratio, which is the ratio between the total value of foreign commerce (exports plus imports) and GDP, is employed here as an indicator of

international trade or even trade openness. Although there is conflicting evidence, a fair number of empirical research (Micheal and Kraay, 2004; Kortt, M. A., 2016; Warner et al., 1995; Pam, 2016) suggests a positive correlation between this ratio and growth ( Kenneth Rogoff, 2000).

The frequent estimator used in panel estimating techniques that include both time- and country-specific (time-invariant) effects is called the fixed effects method. However, using the Ordinary Least Squares (OLS) method to estimate static or within-group models as well as dynamic panel data models can result in results that are possibly biased (Fetahi-Vehapi et al., 2015). There are well-known issues with these models, especially with growth regression models. First, when the time frame is small, explanatory variables have the potential to be endogenous and can be quantified with errors (Nickell, 1981).Secondly, the estimation could be biased by missing variables. (Paul Allison, 1991) suggests a dynamic panel data model with the lagged endogenous variable included as an explanatory variable, utilizing the Method Generalized Moments (GMM) to address these issues. To eliminate the country-specific effect in the Arellano and Bond estimate technique, a first difference equation 1 is required:...

$$\ln Y_{i,t} - \ln Y_{i,t-1} + \beta_0 + \gamma(\ln Y_{i,t-1} - \ln Y_{i,t-2}) + \\ + \beta(\ln X_{i,t} - \ln X_{i,t-1}) + (\lambda_t - \lambda_{t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (1)$$

The “within” estimator is biased as well because the new lagged dependent variable $(\ln Y_i - \ln Y_{i-1})$ and the error term $(\varepsilon_i, t - \varepsilon_{i,t-1})$ are correlated. According to (Stephen, 1998), when the time series are persistent and there are few periods, first difference estimators of GMM are likely to perform poorly.

We utilized the system GMM estimator to estimate the empirical model given in equation 1. The goal of this study is to determine whether or not the economic expansion of the Maghreb countries can be explained by international commerce. We adopted Romer D et al.'s augmented model as our reference model (Mankiw et al., 1992). The authors of this model explicate how variables like the initial GDP per capita, the degree of human capital, gross fixed capital formation, and other variables like trade openness – a variable of interest in this work – and foreign direct investment (FDI) affect the spatiotemporal difference in economic growth. The estimation results are shown in the following table.

**Table 1**. Regression results.

| Variables | MMG in system |
|---|---|
| lgdppc | 1 0.114939** |
| | (0.057) |
| ltr | 0.5103447 |
| | (0.000)*** |
| lhci | 4.495232 |
| | (0.000)*** |
| lgfcf | 0.2528721 |
| | (0.001)*** |
| lfdi | -0.0230728 |
| | (0.431) |
| Hansen test | 0.850 |
| Nombre d’observations | 212 |
| Nombre de pays | 12 |
| Nombre d’instruments | 20 |

At the 10% level, the initial GDP per capita coefficient (lgdppc1) is positive and significant. This demonstrates that conditional convergence is real. The Maghreb's least developed nations typically expand faster than their comparatively more developed counterparts, as indicated by the coefficient's value of less than one (0.114939). However, as we have accounted for structural variations throughout nations in the model using a number of explanatory factors, there will be varying degrees of GDP per capita convergence.

At the 1% level, the trade ratio's coefficient, which represents the degree of trade openness, is statistically significant and negative (-0.5103447). This implies that existing trade flows have a detrimental impact on member states' economic growth in the Maghreb. Therefore, it is imperative to do a thorough analysis of the Maghreb countries' foreign trade structure. This outcome is in line

with the work's findings. Indeed, the author's research indicates that trade has a limit beyond which it adversely impacts the Maghreb countries' economic performance.

This outcome is comparable to other research conducted by Collier (2005) about the Maghreb.

**Conclusion**

The purpose of this article was to investigate the effects of foreign commerce on economic growth in the Maghreb. For this, we have created numerous specifications of the effect of trade openness represented by the trade ratio on economic growth using GDP per capita for the nations in the region involved. We employed the system MMG estimator empirically to mitigate the biases associated with dynamic panel estimations. The data show that there is a substantial and negative correlation between economic growth in the Maghreb countries and foreign commerce. There is no evidence that the area will increase as a result of international trade. Furthermore, a number of other model variables, including the human capital index and gross fixed capital formation, influence how foreign trade affects growth. In other words, trade openness promotes growth in wealthier or countries with greater GDP per capita. When everything else is equal, trade openness tends to help nations with higher gross fixed capital formation and higher levels of human capital, according to the empirical evidence.

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