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Reconciling the Neoclassical Model of Economic Convergence with the Complexities of German Reunification

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Abstract

Considering post reunification productivity differences between East and West Germany, this paper seeks to evaluate the explanatory power of the neoclassical model of convergence. This is achieved by considering two materialised deviations from the theoretical model: accelerated convergence in the 1990s and subsequent stagnation of convergence. The paper explores the exogenous factors including federal policies, the Treuhandanstalt, supply chain structures and competition intensity which may account for these differences to reach a final evaluation of the accuracy of the neoclassical model. This paper ultimately concludes that the explanations of the neoclassical model can be convincingly defended for the 1990s but that the model, even when accounting for exogenous influences, holds little explanatory power regarding the subsequent Eastern productivity stagnation.

Keywords: *German Reunification; Neoclassical Convergence; Beta Convergence; Capital Flows*

1. Introduction

The Reunification of Germany in 1990 marked a historic event which brought together two contrasting economic systems. West Germany and East Germany were two countries controlled radically differently after World War II. West Germany's liberal free market economy was heavily subsidised and received a lot of foreign direct investment, especially from the United States of America. East Germany's inefficient command economy, on the other hand, was economically punished as Russia extracted the country's financial resources in order to cover the costs of the war. The subsequent reunification of Germany encompassed political and economic integration which involved the momentous task of fusing these two diametrically opposite economies.

Since the reunification in 1990, equalising cross-regional differences in living standards has been an important policy anchored in Germany's constitution. Trillions of euros have been spent with the aim of such economic integration. Today, however, East German per capita GDP sits at just 75% (John Gramlich, 2019) of that of the West. Even three decades later, East Germany has not caught up with the West. Chancellor Helmut Kohl's 1990 promise of "blossoming landscapes" (Helmut Kohl, 1990) has not materialised; instead, Germany remains economically divided.

The neoclassical model of convergence outlines the interaction between two distinct regions - here, East and West Germany - and predicts that disparities in productivity will eventually disappear completely. On the basis of the differences between the neoclassical model and the observed realities of German reunification, Udo and Hall (2009) dismiss the model's application to Germany entirely as being "rooted in tautology". However, in the words of Ulrich Blum, "The development in Germany's eastern regions contradicts everything that is known about a market economy where performance matters". By considering the unique complexities of the German case, this paper seeks to reconcile the neoclassical model of convergence with the economic realities.

Two key distinctions between the theory and observed reality exist: accelerated convergence in the 1990s and stagnated convergence since. This paper considers various interfering influences which contribute to these discrepancies. These factors include federal policies, the Treuhandanstalt, supply chain structures and competition intensity. In light of accounting for these influences, this paper evaluates whether the explanatory power of the neoclassical model is sustained.

2. *The Neoclassical Model of Convergence*

As John Hall and Udo Ludwig (2009) explain, the underlying principle of the neoclassical approach to regional development holds that if markets are allowed to function without interference, a region displaying a lower output per capita will grow faster. In the long run, the less productive region fully converges with the richer region, i.e. matches its per capita output. Robert Barro and Xavier Sala-i-Martin have developed this principle to form the "convergence hypothesis"; this concept is built on the assumption that capital flow is the primary instrument driving economic convergence.

Capital in a higher per capita output region is subject to "diminishing returns". This describes a case where each additional unit of capital contributes less to output growth than the previous unit. A more productive region may be closer to peak productivity, meaning that capital is more saturated, and therefore, this region is subject to more punishing diminishing returns. Given this difference, each subsequent unit of capital investment has a higher return in the lower per capita output region.

Capital thus flows from the higher output region to the lower per capita output region. Barro and Sala-i-Martin explain that each addition to capital stock flowing to the less developed region generates "enormous additions to output when the capital stock is small" (Sala-i-Martin 1996). This is to say that if the poorer region is very underdeveloped, the return on capital investment can be very significant. This type of capital transfer is referred to as beta (β) convergence, where the less developed region increases its output per capita at a greater rate than the developed area. This beta (β) coefficient represents the rate of catch-up of the less productive region. By extension, this hypothesis posits that the greater the interregional disparities, the quicker the initial rate of convergence because the difference in return on investment is greater, resulting in a higher incentive for capital investment.

Sala-i-Martin (1996) clarifies that the neoclassical model provides the likeliest explanation with or without perfect factor mobility or technological diffusion. In the case of German reunification, there are very few significant linguistic or cultural differences, which otherwise could make factors of production immobile. Further to this, the rapid conversion of eastern capital to the more developed technology abundant in the West suggests that technology diffusion was relatively rapid. These two indicators suggest that the neoclassical model should have even greater accuracy in its application to German regional theory.

It is worth identifying, however, that internal migration is relatively immobile; despite the financial incentive of a significantly lower cost of living, 2017 was the first year of net immigration to East Germany and saw just 8,100 German people migrate to the East. This figure shows the hesitancy of labour flows to East Germany and the relative immobility of labour between East and West. Given the significance of labour in affecting regional productivity, this immobility acts to disrupt the neoclassical model.

When evaluating the neoclassical model, Hall and Ludwig wrote about Larry Summers' (Barry, 1996) addition to the theory: Summers posits that a beta (β) coefficient of value 2, meaning an annual interregional convergence of 2%, is so consistently achieved by a lower per capita output region that the term "iron law of convergence" is appropriate. This confident claim provides a basis for a qualitative assessment of the neoclassical model.

As stated, the two key discrepancies between the neoclassical theory and the observed realities are that the initial rate of convergence was quicker than projected and that there has since been an unaccounted-for slowdown of convergence.

3. Initial Rate of Convergence

Between 1991 and 1996, per capita income in eastern Germany increased from 42% to 67% of west German levels (Hall and Ludwig, 2009). This rapid convergence represents an average beta (β) coefficient of 5 or, in other words, 250% of the neoclassical prediction. This is the first discrepancy with the neoclassical model considered in this paper.

The significant outperformance of convergence beyond Summers' prediction (a beta coefficient of 2) indicates that either the convergence hypothesis doesn't fully explain Germany's situation, or there was an unaccounted factor at play. This paper considers how two key factors may account for this increased convergence rate: Treuhandanstalt and Germany's federal policies.

A. The Treuhandanstalt and existing Western structures

The Treuhandanstalt (or the 'trust agency') was called into being by East German civil rights proponents for the administration of state property. Its explicit aims were to safeguard the interests of Eastern capital and property ownership. At the most fundamental level, however, the Treuhandanstalt was responsible for transitioning Eastern assets into the market system of a united Germany. The agency was responsible for an estimated four million jobs and was faced with the threats of rigid liquidity issues and the 7,600 managed Eastern firms being acutely vulnerable to insolvency.

During the 1970s, under the communist rule of Honecker, firms in the East were concentrated and expropriated. To combat this, following the reunification and as part of the move towards a market system, the Treuhandanstalt introduced waves of privatisation, the first being aptly named 'Modrow privatisation' after the last leader of the German Democratic Republic. Many of these privatised Eastern firms were managed by effective Western investors, which quickly boosted growth. Furthermore, the Treuhandanstalt oversaw the wider extraction of benefits from being part of a united Germany whereby Eastern firms took advantage of existing stable Western systems. These benefits help explain the rapid growth and economic convergence of the 1990s.

A 1993 study by Tanzi for the International Monetary Fund outlined the wider benefits East Germany experienced from becoming a part of a united Germany:

> The West German system of laws and regulations for government and business which has been well developed over many years of application.
>
> Instant currency convertibility and, by using a currency with a longstanding reputation for stability, guaranteed absence of hyperinflation as a consequence of price liberalisation.
>
> The benefits of special recovery programs set up and financed from the West for infrastructure, restructuring of old firms, establishment of new firms, and stimulation of investments.
>
> Access to West German human resources and expertise; West German investors, banks, and insurance companies are available for starting and redeveloping businesses.
>
> The mature (West) German social security system
>
> Direct access to European Community markets

These numerous benefits saw Eastern firms adapt quickly to capitalist structures and benefit from Western success. By 1995, around 51 per cent of East German state-owned companies were held by West German majorities, accounting for 65 percent of sales (Emil Nagengast, 1995). As demonstrated, this privatisation, under the Treuhandanstalt, led to more effective economic management, which encouraged the growth of reprivatised Eastern firms. The western ownership also gave these eastern firms a competitive edge in international markets which further increased the rate of convergence.

To summarise, the Treuhandanstalt saw a wave of privatisation, which facilitated the transfer of Eastern firms to the market system, where they benefited from experienced Western management. Moreover, the Treuhandanstalt allowed the East to extract wider benefits from the well-managed market economy of the West. These influences existed to promote Eastern growth in the 1990s and contributed to the rapid rate of convergence, raising the beta (β) coefficient. The Treuhandanstalt was dissolved in 1994, and its primary succession, the Bundesanstalt für vereinigungsbedingte Sonderaufgaben (or Federal Agency for Unification-related Special Tasks), was dissolved in 2000. This offers an explanation for the discrepancy of quicker convergence in the 1990s and thus defends the neoclassical model.

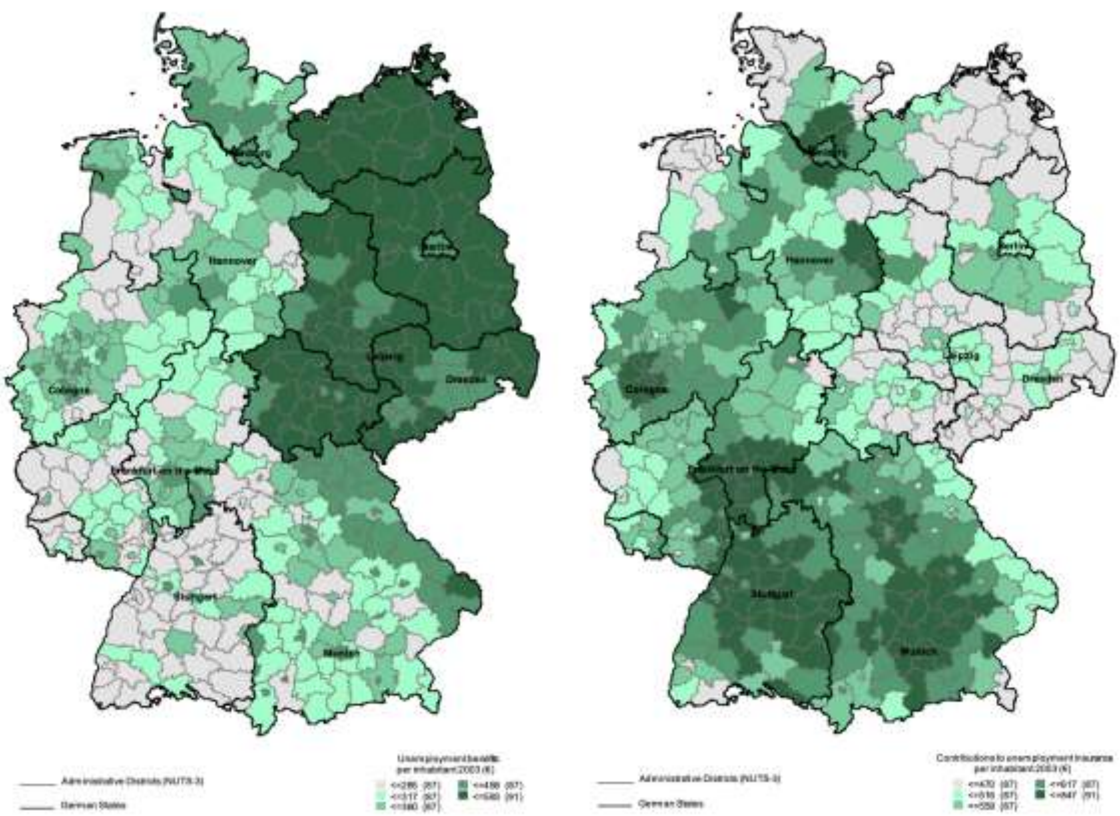
B. Federal Social Policies: social insurance

The second factor this paper considers which contributes to the accelerated convergence is the German federal policies. Federal policies since 1990 have acted to transfer wealth from West to East Germany in an effort to promote economic integration. These transfers benefit Eastern productivity and strengthen market conditions, contributing to the accelerated economic convergence (a higher beta (β) coefficient). Explicit transfer instruments have directly accelerated convergence, such as the German “Joint Task for Improving the Regional Economic Structure”, which provided a total of 34,164 billion Euros for investment grants to the eastern states between 1990 and 2007 (BMVBS, 2007). Whilst it is important to identify the significant role these mechanisms have had in accelerating convergence, this paper seeks to address instead the implicit vehicles of convergence, those being social insurance policies.

Germany's federal tax and transfer systems don't display the explicit intention of supporting East Germany; however, they remain catalysts of convergence. As Bruckmeier and Schwengler (2009) describe, because income differentials between East and West have persisted over the last few decades, the federal tax and transfer system's effects influence permanent income. This is to say that they provide indirect subsidies to the Eastern regions funded by Western tax revenues; in this sense Germany's social policies implicitly catalyse convergence and add to the beta (β) coefficient.

Since the late 19th century, under Chancellor Otto von Bismarck, Germany has had a progressive taxation system, in which higher earners suffer a greater tax burden and inequality is reduced. In the current system top earners pay an income tax of 45% (PWC: individual taxes on personal income, 2023), whereas the lowest earners are exempt from income tax. Income tax is the primary contributor to German tax revenues and is used to fund pensions and unemployment insurance, whereby retired and unemployed citizens may be eligible for monthly federal payments. The 26% real wage gap between East and West (Elke Asken, 2019) means that tax revenue collection is in itself progressive and a catalyst of convergence, but as this paper explores, the destination of these revenues compounds this effect. Due to the greater redistributive effects, this paper focuses on unemployment insurance.

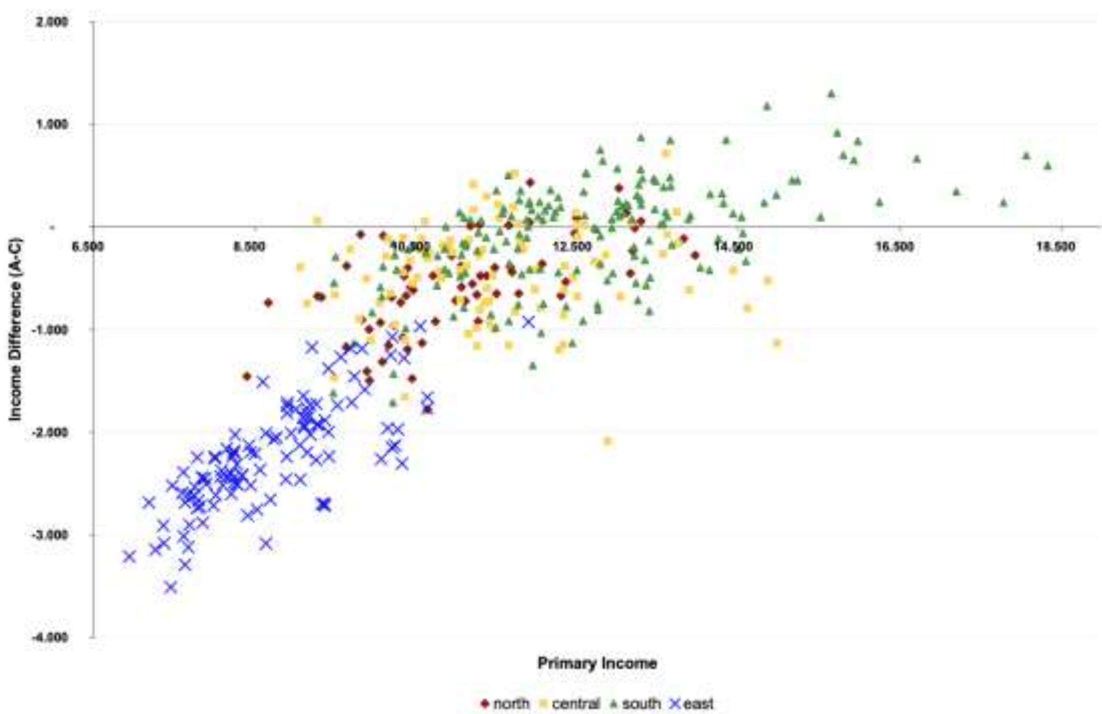
Figure 1: Regional distribution of unemployment benefits and contributions to unemployment insurance per inhabitant in 2003 (using NUTS-3 borders)



Source: unemployment and employment statistics of the Federal Employment Agency 2003; Bruckmeier-Schwengler's calculations (2009)

The allocation of government spending on unemployment insurance sees income redistributed between individuals with high unemployment risks and those with low risks. Figure 1 has very apparent discrepancies between contributions and receptions of unemployment insurance between East and West - the West disproportionately contributes to unemployment insurance whilst the East disproportionately receives the benefits of unemployment insurance. Writing about tax systems Kurz (2002) wrote that if economic shocks are directly expressed in unemployment, then these transfers provide a regional stabilisation system. This is a direct benefit accrued by the East due to the progressive taxation system and receiving more per capita unemployment insurance. Furthermore, receiving employment directly improves Eastern living standards. The clear difference between East and West as illustrated by Figure 1 signifies this described redistributive effect and, therefore, an acceleration of convergence.

Figure 2: Average difference between primary income (A) and income after social insurance (C) in € per inhabitant 2003 for 439 districts (using NUTS-3 borders)



Source: employment and unemployment statistics of the Federal Employment Agency 2003; national income tax statistics of the Federal Statistical Office 2001, statutory pension scheme 2003; Bruckmeier-Schwengler's calculations (2009)

Figure 2, quantifies the impact of the insurance policies on incomes which again reinforces the existence of a redistributive federal system. As Bruckmeier-Schwengler calculates, in eastern districts, the average income increases by about 22 per cent compared to primary income A (from 9,118 to 11,103 Euro). On the other hand, the numerous districts above the x-axis all experience a net fall in incomes due to this transfer; every one of these regions is in the West, showing that every Eastern region benefits from these transfers. The most benefiting Eastern region receives a 41% increase in real incomes due to this set of federal policies which reveals the significance of the transfers and accelerated convergence. Overall, the correlation shown by Figure 2 powerfully shows the redistribution and quantifies the income benefits accrued more by East Germany.

To summarise, it is the asymmetries between incomes and employment that mean that the West disproportionately suffers the federal tax burden; it also means that the East receives more of the benefits of the federal insurance policies. These redistributive transfers act to increase Eastern incomes and accelerate convergence. This insight is another explanation for the rate of convergence in the 1990s when the East was absorbed into a united Germany and introduced to this progressive taxation structure.

4. Stagnation of Convergence: An East German Growth Trap?

The second discrepancy with the neoclassical model is the stagnation of convergence from 2000 onwards. Former German Chancellor Helmut Kohl's 1990 prediction of "flourishing landscapes" in the East still has not materialised despite the initial successes. The rapid convergence of the 1990s quickly slowed down by 2000 to a damaging level. In the 20 years after 1996, East German output per capita rose only to 74% - displaying a beta (β) coefficient of just 0.35 and not Summer's predicted coefficient value of 2.

This drastic change in trajectory signifies another unaccounted difference to neoclassical theory. Certainly, this difference qualitatively undermines Summers' prescription of an "ironclad" law of convergence. Considerations of an East German structural growth trap could, however, account for this damaging stagnation. The existence of a growth trap would act to prevent East Germany's catch-up. Whilst this would nullify the explanatory power of the neoclassical model after the onset of Eastern economic stagnation, it would sustain its validity up to that point.

A. Interregional Supply Chains and the Treuhandanstalt

The Treuhandanstalt privatised firms expropriated under Honecker and sold eastern German companies and assets to western firms, often at a symbolic price of one Deutsche Mark in exchange for job guarantees. Whilst, as described, this brought prosperity to East Germany in the 1990s, it ultimately came at a cost in the long run. The program achieved its aim and by 1994 had sold virtually all East German companies to the West and after this investment predictably dried up. Many Eastern Germans saw these sales as giving away valuable assets to Western firms. The Treuhandanstalt proved critical in determining East Germany's position in the country's supply chains, ultimately creating damaging conditions that limit Eastern growth to this day.

The unequal terms of German market structures contribute to the growth trap by condemning Eastern production to an intermediary role. The economic integration policies across the 1990s saw East Germany fall from one of Europe's leading independent producers to a region playing just an intermediary role in unifying Germany's supply chains. The Treuhandanstalt gave western industry leaders the power to dictate interregional supply chains, which understandably resulted in terms favouring the West. Controlled by decisions made in the West, eastern Germany was forced to specialise in the low-value add beginning of production, creating low value intermediary goods) which were then sent to the West. This supply-chain structure, created by the Treuhandanstalt, limited eastern growth. West Germany, on the other hand, became the location of company headquarters and specialised in the high value-add production of finished goods. This saw Western Germany benefit enormously and reap the rewards of German production whilst the East was forced into low-value early-stage production for the Western-controlled firms.

To complement the transfer effects of the Treuhandanstalt, the 1990 reunification treaty also transferred capital stock ownership to individuals and corporations largely based and headquartered in the western region. By 2004, among Germany's largest industrial firms ranked by revenues, only one firm was headquartered in the eastern region. Similarly, of the top 100 service sector firms, no company held its headquarters in eastern Germany. The same is true for the top 100 German retail firms (see Frankfurter Allgemeine, 2005). The location of the headquarters has also contributed to the eastern growth trap. Firstly, the location of corporate headquarters often influences the geographic distribution of high-income individuals, as these locations tend to be where senior employees work. This concentration of high-income individuals can contribute to a region's GDP per capita and increase value-add. In addition, corporations often invest in local infrastructure when establishing their headquarters. This can lead to enhancements in public utilities, transportation, and other public goods, stimulating economic activity and, importantly, raising the standard of living. Higher living standards can, in turn, attract more affluent individuals to the region, who contribute further to its economic productivity. This exacerbates the productivity divide between regions, trapping the less productive region of former East Germany in a cycle of lower growth.

More broadly, the developments of Germany's supply chains favour the West and limit East German production by virtue of Western management. The associated eastern German suffering can be classified under Veblen's "absentee ownership" theory. The owners of eastern factors of production and companies are overwhelmingly based in the West and are absent in the day-to-day management of industrial processes. Veblen wrote about how this can lead to a disconnect between the interests of the owners and the interests of the community or the workers. The owners, whose primary focus is to maximise profits, might make decisions that negatively impact workers or the local community. The reduction of the East to a low-value manufacturer in the interests of Western management is an example of this. In the case of East Germany, ownership and production are clearly very geographically disconnected; following Veblen's theories, this further impairs eastern growth and provides evidence in support of a growth trap.

B. Competition Intensity

In their 2021 discussion paper, Aghion and Howitt and Aghion, Bloom, Blundell and Griffith (AHABBG) wrote about the relationship between innovation and market intensity. They investigated creative destruction, which describes how old industries or products are replaced by innovative technologies and ideas, driving economic growth and progress. They found that the relationship is U-shaped, i.e. low and high product market competition triggers high innovation levels. As Blum points out, firms in East Germany are "well capitalised with equity but have little market access"; this is in part due to their average small firm size and location at the beginning of the supply chain. Following the model proposed by AHABBG, this means that Eastern production is not driven by market conditions, instead sitting in the non-innovative trough of the U-shaped curve. This signifies an impairingly low level of innovation and reinforces the prescription of an Eastern growth trap.

Despite their favourable capitalisation, these firms are hindered by limited market access, preventing them from ascending out of this innovation trough. This lack of innovation suggests further that a growth trap limits eastern firms. Without the pressure to innovate and improve, productivity has stagnated and fallen behind relative to the more healthy market competition in the West.

Overall, the market interest and supply chain role of former East Germany does suggest that structural limits exist on eastern growth. Quantifying to what extent this can account for the lasting 20-30% difference between western and eastern output is difficult, however. Nonetheless, the suggestion of a growth trap can explain the deviance from the neoclassical projections.

Conclusion and Recommendations

To conclude, this paper has established that the case of East German convergence has a layer of complexity entirely unaccounted for by the "theory of convergence". By accounting for the Treuhandanstalt and federal policies, a convincing argument is made for a great rate of convergence in the 1990s. By incorporating the catalysing effects of these exogenous factors, the meaningful explanatory power of the neoclassical model is maintained.

Considering the stagnation of convergence, the existence of a growth trap is supported by evaluating competition intensity and supply chain structures. However, without qualitative support, this doesn't fully account for this failure of the neoclassical model. A multi-level regression analysis would help evaluate whether this growth trap can fully account for the discrepancy of the neoclassical model. Future papers could consider how other models of regional theory like Gunnar Mydral's evolutionary institutionalist model would explain the slow-down in the Eastern per capita productivity catch-up.

Ultimately, this paper finds that the neoclassical model remains of considerable utility in explaining the convergence in the 1990s but that for the following slow-down of convergence, the model's explanatory power is greatly reduced.

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