The Growth Consequences of Socialism

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The discussion of the growth consequences of socialism has fulminated for a century, sparked off by the Calculation Debate in the 1920s and 30s, and has concerned the performance of the Soviet Union in the 1950s and the mixed development in the 1990s after communism collapsed in Central and Eastern Europe. We aim to inform these debates by providing an empirical assessment of how socialist economies performed across the second half of the 20th century. Using both neighbour comparisons as well as more formal empirical analysis of developing countries that turned socialist after independence, we derive a set of estimates of the degree to which the introduction of a planned socialist economy affects long-run growth and development. All analyses point towards an annual growth decline of approximately two percentage points during the first decade after implementing socialism.

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Acknowledgements

Introduction

Throughout the last century, a substantial part of the world population has lived under some form of socialism. At the peak, in 1980, over roughly 1.5 billion persons out of a total world population of approximately 4.4 billion lived in socialist countries (Encyclopedia.com, 2022). Following the end of the cold war and the publication of texts such as Fukuyama's (1989) "The End of History?", socialism seemed to be intellectually discredited and dead as an economic system. Nevertheless, and as recently noted by Niemietz (2019), there are signs of a revived and enthusiastic interest in socialism and planned economies. Obvious indicators are the relative success of politicians and parties such as Bernie Sanders in the US, Syriza in Greece, or Podemos in Spain (Fagerholm, 2016; Katsourides, 2016; Ramiro and Gomez, 2016). Some popular-scientific accounts have also revived the idea of a planned economy (e.g., Phillips and Rozworski, 2019), and in the US and UK, socialist is no longer pejorative as polls show that socialism is gaining popularity especially among women and Black Americans (Salmon, 2021), and younger Britons (Niemitz, 2021).

Theoretically, it is fair to say that economists are sceptical of the idea that socialism would have beneficial consequences for the economic performance of a country, although the reasons for such scepticism vary. From a neo-classical mainstream view, the problem with socialism comes mainly from the weak or absent incentives for work and investment in socialist economies and the suppression of the price coordination mechanism of economic activities. To this can be added the weakened incentives for innovation and entrepreneurship, though the role of the state in the innovation process is much discussed (see e.g. Mazzucato (2013) and Foss et al. (2019) for two opposite contributions). In addition to the critique based on standard and new growth theory, a forceful critique of socialism comes from the Austrian school, according to which the main problem with socialist planning is the waste of knowledge and creativity that is inherent in centralised decision-making (Hayek 1935, 1937; Kirzner 1997; Zeckhauser 2006).

Due to the lack of economic data on planned socialist economies, only a few studies have systematically assessed to which degree socialism affects economic growth. Some voices in recent political debates even claim that these effects are minor or possibly zero (e.g., Blakeley, 2019). This paper therefore looks at the effects of socialism, both through neighbour comparisons and innovatively by using new and improved data covering a somewhat omitted group of 22 developing countries that turned socialist. We follow the definition of the United Nations (2020) in defining socialist economies as an economic system in which economic decisions are made by the state or government rather than by the interaction between consumers and private businesses, as well as von Mises (1951) who emphasised that the ownership of the means of production is central as it entails the right to make these economic decisions. We define a society as socialist if the executive branch (i.e. the part of government that enforces law) identifies the

state as such, and if its policy choices are consistent with a socialist planned economy. For measurement, our preferred operationalisation is the *de facto* indicator of socialism from Bjørnskov and Rode's (2020) update and expansion of the Democracy and Dictatorship dataset by Cheibub et al (2010).

Our fixed effects estimates indicate that developing countries transitioning into socialism on average lose approximately 2–2½ percentage points annual growth relative to similar countries. A set of simple placebo tests suggests that these estimates are likely to be causal. These losses are qualitatively similar to those experienced by countries in Central and Eastern Europe that were forced to implement socialist economies after WWII and imply substantial losses of human welfare over a typical socialist spell of one and a half decades in a developing country.

The paper proceeds as follows. In the next section, we discuss different types of socialism and describe the commonalities among all socialist economies, and we connect this discussion to modern growth theory to outline how and when socialism arguably constrains economic development. Section 3 outlines our data and empirical strategy and discusses how to measure a somewhat fuzzy concept such as socialism. Section 4 presents empirical evidence, and section 5 concludes.

1   Types of socialism and socialist economies

1.1   Varieties of socialist thinking

Socialist and communist ideas have been part of economic thinking since Plato's ideal state in the fourth century BCE, but the term socialism first appeared in Robert Owen's *Co-Operative Magazine* in 1827. It was initially used to designate the proponents of cooperative ownership like Owen in Great Britain and Fourier in France in the 1830s and 1840s. In general, socialists have refused the individualistic, competitive foundations of capitalism and believed in an ideal society without poverty and oppression based on cooperative action and a significant degree of common ownership. However, the difficulty of defining socialism is apparent (Esenwein, 2005) as the socialist movement has been divided since the 1850s. Different factions have clashed, and continue to clash, over the essential questions (King, 2003): Should the new society be achieved by reforms or revolution? Should it be democratic or autocratic? Should the economy be a self-managed form of social anarchism or run by the state? Would the economy be based on market or non-market relations? And what would be the preferred form of ownership – state, cooperative, or private?

After the publication of *The Communist Manifesto* in 1848, the faction around Karl Marx and Friedrich Engels became the most influential within the socialist movement. They believed in a revolutionary transformation of the existing social order and in implementing a dictatorship of the proletariat. Regarding the economy, their version of state socialism would be based on central planning and full nationalisation of factors of production. To distinguish it from early "utopian" socialism, Marx and his

followers started to call themselves "scientific" socialists. In parallel, scientific socialism came to be called "communism" and "Marxism".[1]

Besides early utopian socialism and dominant scientific socialism, anarchism belonged to the strongest socialist currents in the second half of the 19th century. Anarchists like Mikhail Bakunin and Peter Kropotkin refused the dominant role of the state as stressed by the Marxists. Kropotkin (1902) instead emphasised a human propensity for spontaneous cooperation (which he called "mutual aid") and argued that the state, which was in any form an oppressive force, should be destroyed. Similarly, syndicalists like Emile Pouget (1908) highlighted the importance of individual freedom and believed in a new society democratically self-managed by workers, with a positive role for trade unions. Therefore, anarchism and syndicalism are often jointly referred to as Libertarian Socialism.

In the late 19th century, several strands of non-Marxist state socialism emerged. These rejected the military character of Marxism and its vision of class conflict. Among them, Fabianism became the most powerful one. Fabians were mostly upper-middle class intellectuals (such as George Bernard Shaw and Sidney and Beatrice Webb) who advocated a gradual, peaceful change to socialism through laws and democratic elections. In the economic area, they called for progressive taxation, socialisation of the factors of production, and central planning (Shaw, 1889).[2]

However, the main and long-term challenge to Marxism came from within this movement. In the 1890s, the former Marxist Eduard Bernstein (1909) initiated a revision of Marxist doctrine. Bernstein rejected its fundamental economic concepts, such as economic determinism, the labour theory of value and the theory of surplus value. Observing the improving living conditions of the working class in Germany, he tended to believe that socialism can be achieved by peaceful, non-revolutionary ways instead of class struggle. This current started to be called either revisionist socialism by the Marxists, or, democratic socialism by its advocates. Even though revisionism was rejected by the socialist mainstream as a heresy (Rees, 2005), it became the ground for the development of pluralistic Western socialism and social democracy during the 20th century.

The label of market socialism refers to attempts to respond to the real installation of centrally planned economies in Eastern Europe, which appeared after World War II. Following the interwar debate between socialists such as Oskar Lange (1936, 1937) and Abba Lerner (1934) and liberal economists including Friedrich Hayek (1937) and Ludwig von Mises (1944), some authors tried to merge plan and

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[1] Rees (2005) remarks that communism and Marxism have often been taken as "inseparable, if not synonymous" concepts. On the other hand, he admits that not all communists have been Marxists and vice versa. Esenwein (2005) adds that Marxism started to be widely referred to as "communism" by Lenin and the Bolsheviks after their revolution to distinguish their thinking from "revisionist" socialism in Western Europe. After the founding of the Soviet Union in 1924, this political ideology was called "Marxism-Leninism" as well.

[2] In addition, Guild socialism represented a compromise between the libertarian and state socialists at the turn of the 19th century (King, 2003).

market or to find a "Third Way" between capitalism and Marxist socialism. One such approach was pursued by Ota Šik in Czechoslovakia (Šik, 1968, 1976) while other authors attempted to revive the ideals of self-managed socialism. For instance, Jaroslav Vanek (1970) published a comprehensive neoclassical model of labour-managed firms maximising net income per member. Further to Vanek, Nobel Laureate James Meade (1972) examined the theoretical behaviour of non-egalitarian labour-managed firms.

Finally, after colonial independence many African politicians developed versions of socialism that were based on sharing economic resources in what was seen as a traditional African way. These varieties are typically labelled African socialism (cf. Friedland and Rosberg, 1964).[3] Although decidedly varied, this movement shared a view of reacting against Western "intellectual imperialism" with the basic argument that traditions of communal ownership of land in much of Africa provided a practical basis for socialist societies with fully nationalised means of production (see, e.g., Mboya, 1963).

1.2   Types of socialist economies and their characteristics

The varieties of socialist thinking were reflected in the development of real economies throughout the 20th century in significantly different ways. Scientific socialism/Communism/Marxism has clearly left the most visible impression. Following communist ideas, principles and policies, centrally planned economies were established not only in the Soviet Union but successively across all continents except Australia. Additionally, the ideas of market socialism were reflected in attempts to reform inefficient centrally planned economies, such as the Soviet reforms under Nikita Khrushchev after 1956, the Czechoslovak "Third way" of Ota Šik before 1968, and the Soviet attempts of *perestrojka* under Mikhail Gorbachev after 1985. On a substantially smaller scale, the ideas of self-managed socialism were implemented in Yugoslavia under Josip Broz in the period of 1952–1988, as well as in Algeria between 1960 and 1965. In the majority of cases, the type of socialism actually implemented has nevertheless followed the centralised example of either the Soviet Union or Maoist China.

On the contrary, revisionist and democratic socialists have significantly affected the development in Western Europe through the 20th century and beyond. An increasing number of Western socialists and social democrats has since the 1920s begun to accept capitalism and market economy as a fundamental arrangement of economic relations and shifted their political focus toward the area of redistribution and social policies. Although many scholars (in a confusing way) still use the term *socialism* when discussing the economic systems in Western Europe,[4] we generally understand Western economies as *market economies* with less or more intensive social policies and interventions in macroeconomic areas.

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[3] For instance, Idahosa (2005) distinguishes among North African "Arab" Socialists, African socialists and Afro-Marxists.
[4] For example, Sassoon (2010) distinguishes between modernising socialism (i.e., communism) and socialism as a regulator of capitalist society. Similarly, a "Swedish model of socialism" is frequently mentioned (King, 2004).

To summarise, across different types that may differ in specific details we identify "socialism" with the dominant current of scientific socialism, thus, we use it as synonymous with "communism", as well as "Marxism". Consequently, for the purpose of our empirical analysis, we identify a socialist type of economy with a centrally planned economy like the one established in the Soviet Union in the 1920s, Eastern Europe in the late 1940s and in numerous African, Asian and Latin American countries between the 1950s and 1980s. We underline the subsequent typical features and related problems of centrally planned economies:

- Autocracy, i.e. the *de facto* rule of a single (typically communist or socialist) party in which the legal order is subordinated to the needs of the ruling party.

- Fundamental economic institutions including a system of private property rights are transformed through nationalisation of the means of production.

- Basic economic coordination mechanisms are transformed. Price coordination of economic activities is replaced by coordination based on command and centralised planning.

- Planning of overall economic activities from the central level is introduced, typically in the form of 5-year plans. As such, government controls most aspects of economic activity: it decides what goods will be produced and how they will be produced.

- The government applies pervasive paternalistic policies aimed at creating obedience, conformism and passivity of individuals. As a result, informal institutions are also transformed in the long run (Costa-Font and Nicińska, 2020).

1.3   Socialist economies in growth theory

In standard (neo-classical) growth models following Solow (1956), growth is driven by exogenous technological progress when the economy's capital-output rate is constant. If the capital stock increases, growth will be higher as the economy transitions from one steady state to another. From this perspective, socialism (or any economic system) can affect growth via 1) the size of the capital stock, 2) the productivity of capital (for a given technology), and 3) the rate of technological progress. In the long run, the third channel is likely to dwarf the others, although the other two are also empirically relevant. As shown by Barro and Sala-i-Martin (2004) the temporary effects in neo-classical growth models may still last for 20 years or more as the economy adjusts to a new steady state.

Based on the characteristics summarised in section 2.2, socialist economies can be expected to have lower productivity of capital and slower technological progress, although socialist economists

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However, as Niemitz's (2019) survey of the history of Western support for socialism illustrates, many of these examples of use of the word socialism are examples of considerable conceptual stretching.

emphasised technological innovation as an advantage of socialism (cf., Ofer, 1987). Theoretically, socialist economies could compensate by increasing the capital stock (the so-called extensive growth strategy) but that strategy is problematic in the long run; and as noted by Easterly and Fischer (1995), market economies can also increase their capital stocks over time, which seems to boost growth more than it did in the Soviet Union. A main problem in socialist economies, which arguably makes their investments less productive, is that when government determines the prices of goods and services, the informative and allocative functions of prices are suppressed (Hayek, 1945). The dispersed knowledge created in market economies for decision-makers is therefore not available for the planning authorities allocating investment funds and resources. At best, authorities must therefore allocate investments and other resources based on a combination of simulated shadow prices – as the Soviet Union began to do in the 1960s – and self-reported information from the companies that receive the resources. Yet such a system of information gathering creates moral hazard problem, as companies typically have incentives to provide biased information and because only existing firms provide information (cf., Laffont and Tirole, 1986).

The self-reporting system also creates perverse incentives for stated-owned companies not subject to competition, such that instead of aiming at the maximisation of profits, state-owned firms aim at maximising the flow of resources from the centre, and thus overestimate costs. Any information available to planning authorities is therefore not only incomplete, but often systematically biased. Such problems are exacerbated by the ineffectiveness of the planning system due to its high demand on bureaucracy and monitoring, making it inflexible and slow to respond to changing conditions (cf., Kornai, 1959).

In addition, Romer's (1990) contributions to endogenous growth theory suggest that without solid private property rights firms cannot appropriate the returns of investments in innovation, thereby effectively removing any incentive outside of government coercion to innovating. Yet, such decentralised experimentation is arguably necessary for turning pure invention into economically relevant innovation (cf., Mokyr, 2016). As emphasised in recent contributions, even with substantial scientific progress, property rights or some other institution, which enables companies to appropriate the returns to risky innovation, are necessary for academic progress to be turned into actual productivity increases (Berggren and Bjørnskov, 2022).

The main finding of Easterly and Fischer (1995) that Soviet growth over the period 1960-89 was among the lowest in the world, conditional on the accumulation of both physical investment and human capital, is therefore far from surprising. Moreover, the relative performance of the Soviet Union worsened over time (Ofer, 1987). The fact that growth was low also when controlling for capital accumulation suggests that the Soviet Union suffered from productivity problems, and Easterly and Fischer attribute these to a low elasticity of substitution between capital and labour. Other case studies include Grier and Maynard

(2016) who estimate the economic effects of the Hugo Chavez regime in Venezuela using synthetic controls and document a substantial fall in per capita income after the Chavez regime turned socialist, Bastos and Pavlik (2024) who explore the effects of the Cuban Revolution and the American Embargo, and the analysis of durable left-populist regimes in Latin America by Absher et al. (2020). Glitz and Meyersson (2020) document how East Germany's productivity partially held up in areas where the country engaged in industrial espionage against West Germany, thereby indicating the importance of market-tested innovation for economic growth. Finally, Mladina (2021) compares Central Europe, the Baltics, China, Russia and Venezuela to the US and concludes that socialism results in poverty.

In summary, socialism can affect long-run economic growth through several mechanisms. Most of these affect growth through reduced productivity development, and most knowledge comes from either single-country studies or the study of the Soviet bloc. In the following, we explore whether these examples generalise to developing countries.

2 Data and empirical strategies

To assess the growth consequences of socialism, we first rely on two datasets with broad coverage sufficiently far back in time. In our neighbour comparisons, we employ data on purchasing-power adjusted GDP per capita from the Madison database (Bolt and van Zanden, 2020). The Madison data include GDP measures from socialist economies in Central and Eastern Europe, which enables us to provide direct neighbour comparisons in the following. When we next turn to cross-country estimates, we instead use the Penn World Tables, mark 10 (Feenstra et al., 2015) from which we draw data on purchasing-power adjusted GDP per capita and GDP per full-time employee, as well as data on investment rates, government final spending and trade volumes (all as percent of GDP), and the logarithm to population size. In additional tests, we also apply the state ownership index from the most recent edition of the Varieties of Democracy dataset (Coppedge et al., 2016), which is coded from 0 – denoting total state ownership – to 4, indicating no state ownership.

We use data from Bjørnskov and Rode's (2020) update of the Democracy and Dictatorship dataset in Cheibub et al. (2010), covering a total of 192 sovereign countries yearly between 1950 and 2020. The data include both a dichotomous democracy indicator, based on a minimalist conception of democracy and a socialism indicator, as we discuss at length in Appendix A.

2.1 Socialist countries

As a first assessment of growth in socialist countries, we examine three well-known examples of China, Czechoslovakia and Yugoslavia, and use neighbouring countries, Taiwan, Austria and Greece, for comparison. Next, we provide a similar neighbour comparison in developing countries that turned socialist in the 1960s and 1970s. The full dataset includes 22 countries for which there are sufficient

available data: Angola, Benin, Cambodia, the Republic of Congo, Ethiopia, Ghana, Grenada, Guinea, Guinea-Bissau, Laos, Madagascar, Mali, Mozambique, Myanmar, Nicaragua, Sao Tomé and Principe, Senegal, Sudan, Tanzania, Venezuela, Vietnam, and Zambia. For comparison, we identify a set of 22 geographical neighbours[5] – countries of proportionate levels of economic development having direct borders with their socialist counterparts from the main dataset. All transitions in the full data are reported in Table 1 and the full dataset is summarised in Table 2 where 12.7 % of all country-years were coded as socialist. The average PPP GDP per capita in countries that subsequently became socialist was 3353 USD with a median of 2528 USD versus 4598 and 2230 USD in neighbouring countries (p<.48). Similarly, average growth in the three years prior to introducing socialism was 3.5 % versus 4.8 % in neighbouring countries (p<.78) and thus not significantly different although much more variable across countries that turned socialist versus their neighbours. Under the assumption that neighbouring countries are sufficiently similar to those developing countries that turned socialist, the assumption of parallel pre-event trends is therefore satisfied. As such, to the extent that it is possible to assess, it is unlikely that the estimates in the following are substantially affected by endogeneity bias.

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[5] Appendix Table A4 lists all neighbouring countries from which we derive the neighbour GDP comparisons.

Table 1. Transitions in and out of socialism, BR data 1950-2021

Country	Socialist period	Country	Socialist period
Afghanistan	1978–1991	Lithuania	–1990
Albania	–1990	Madagascar	1975–1992
Angola	1976–1990	Mali	1960–1968
Armenia	–1990	Moldova	–1992
Azerbaijan	–1992	Mongolia	–1991
Belarus	–1990, 1994–	Montenegro	–1990
Benin	1974–1989	Mozambique	1975–1990
Bosnia and Herzegovina	–1990	Myanmar	1974–1988
Bulgaria	–1990	Nicaragua	1979–1989
Cambodia	1975–1981	North Macedonia	–1990
Cape Verde	1975–1989	Poland	–1989
Congo, Republic of	1969–1991	Romania	–1989
Croatia	–1989	Russia	–1991
Cuba	1960–	Sao Tomé and Principe	1975–1990
Czech Republic	–1989	Senegal	1962–1980
Estonia	–1990	Serbia	–1990
Ethiopia	1975–1990	Slovakia	–1989
Georgia	–1992	Slovenia	–1990
Ghana	1960–1965	Somalia	1970–1990
Grenada	1979–1983	Sudan	1969–1984
Guinea	1959–1983	Tajikistan	–1992
Guinea–Bissau	1974–1980	Tanzania	1967–1984
Hungary	–1989	Turkmenistan	–1992
Kazakhstan	–1992	Ukraine	–1990
Kyrgyzstan	–1992	Uzbekistan	–1992
Laos	1976–	Venezuela	2000–
Latvia	–1990	Vietnam	1975–
Libya	1970–2010	Zambia	1968–1989

Table 2. Descriptive statistics

	Mean	Standard deviation	Observations
Growth, GDP per capita	1.940	6.255	10118
Growth, labour productivity	1.666	6.369	9274
Log initial GDP per capita	8.889	1.215	10299
Log initial labour productivity	9.919	1.159	9454
Investment rate	.218	.151	10299
Government spending	.190	.122	10299
Log population size	1.610	2.095	10299
Democracy	.454	.497	14499
Socialist (BR)	.127	.333	14499
Log time socialist (BR)	.398	1.088	14499
Socialist (CCP)	.149	.357	14345
Socialist (DPI)	.122	.328	8063
State ownership	2.288	.834	10962

2.2 Control variables and estimation strategy

Apart from the direct neighbour comparisons, we also provide a set of standard cross-country regressions in which we estimate the specification in 1). The dependent variable is annual growth in purchasing-power adjusted GDP per capita in country i at time t, which we refer to as GDP growth, ΔY_i,

t. Alternatively, we also provide estimates of growth in GDP per full-time employee, which we consider a simple measure of labour productivity and thus refer to as productivity growth. We follow standard practice and add the log to Yi, t.1 as a convergence term, and a vector of control variables, Xu, t-1, which includes investment rates, government spending, trade volumes and democracy.

$$\Delta Y_{i,t} = \alpha + \beta_1 \ln Y_{i,t-1} + \beta_2 X_{i,t-1} + \gamma\, S_{i,t} + \upsilon\, D_{i,t} + \varepsilon_{i,t} \qquad\qquad 1)$$

We also add a full set of country and annual fixed effects, $D_{i,t}$; $\varepsilon_{i,t}$ denotes the error term. As such, we begin by assuming that our estimates are causal in the sense that we assume that developing countries' growth prospects did not affect their probability to become fully socialist. However, we deal with the problem in a set of placebo test in which we 'assign' socialism to one of a socialist country's geographical neighbours that were never socialist. In the case a socialist country had several non-socialist neighbours, we choose the country in which GDP development in the ten years prior to socialism was most correlated with that of the country that became socialist.[6] As such, this test estimates what happens if we assign socialism to the wrong neighbouring country.

2.3   Transitions in and out of socialism: Trends and examples

Figure 1 shows how the share of socialist countries in the world increased gradually after World War II, peaked in 1979 (according to the BR-database, in the 1980s according to the CCP-data), and fell dramatically in 1989–1991 due to the collapse of the Soviet Union. As a result, country level spells of socialism varied, as shown in Table 1. Transitions out of socialism likewise varied, leading some commentators to see it as unduly chaotic, and claim that it would create high levels of unemployment and severe economic dislocation (cf., Knell and Rider, 1992). Other observers at the same time saw most rapid transitions as remarkably successful and necessary to achieve robust transition (e.g., Åslund, 1992).

Apart from the rise and fall of the Soviet Union, the most common scenario is that countries that used to be colonies ended up with socialism after achieving colonial independence, and eventually left socialism because of both internal and external forces. To illustrate and exemplify this process, we provide two examples. Angola achieved independence in 1975 as a Marxist–Leninist one-party republic ruled by the People's Movement for the Liberation of Angola (MPLA), which was backed by the Soviet Union and Cuba. The country was plagued by unrest and civil war between the MPLA and the opposition, the insurgent anti-communist National Union for the Total Independence of Angola (UNITA), which was supported by the United States and South Africa. The transition from socialism

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[6] This yields 15 placebo countries: Burkina Faso standing in for Benin, Colombia for Venezuela, the Comoros for Madagascar, Djibouti for Ethiopia, DR Congo for Angola, El Salvador for Nicaragua, Equatorial Guinea for Sao Tomé and Principe, Gabon for the Republic of Congo, India for Myanmar, Malawi for Zambia, Mali for Senegal, South Africa for Mozambique, Thailand for Laos, Togo for Ghana, Trinidad and Tobago for Grenada, and Uganda for Tanzania.

came when the MPLA abandoned its Marxist ideology at the party congress in 1990 and declared social democracy to be its new ideology.

Senegal is a similar example. The country was a French colony, and the first president after independence in 1960 was Léopold Sédar Senghor, founder of the Socialist Party of Senegal and often described as a poet, politician and cultural theorist.[7] The country is classified as socialist from 1962, when a failed coup led to a substantial strengthening of the president's power. Educated in France at the University of Paris where he later also worked as a teacher, Senghor is typically classified as an African rather than a Marxist socialist (Friedland and Rosberg, 1964). Note also that Senghor represented a moderate, less radical version of African Socialism and unlike other ex-colonies, Senegal remained closely aligned with the French government. The transition from socialism is registered when Senghor retired and transferred power to Abdou Diouf in 1981, who reduced government involvement in the economy and continued Senegal's democratisation (with Diouf leaving willingly after losing the 2000 presidential election).

As such, both the transition into socialism as well as transitions out of socialism have often been events affected by country-specific and sometimes individual-specific characteristics but unrelated to prior economic performance. Of the 22 countries with full data, ten transitioned out of socialism as a consequence of the exogenous collapse of the Soviet Union and the subsequent loss of political and economic support. However, this explanation applies to Angola but not, for example, to Senegal. When we in the following turn to exploring the growth consequences of spells of socialism, we treat these transitions as approximately exogenous (see also Figure 3).

3   Empirical analysis

Our empirical analysis has three parts. First, we introduce three well-known examples of countries that once were relatively similar but ended up with different economic systems. Next, we do a similar neighbour comparison in developing countries. These simple but illustrative comparisons strongly indicate that the introduction of socialism has dire growth consequences. Finally, we present some standard econometric evidence.

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[7] Senghor's (1991) poem Midnight Elegy aptly exemplifies his distinct combination of modernity and awareness of an African heritage known as *Negritude*: "I stand up lucid, strangely lucid / And I am handsome / Like the one-hundred meter runner, like the black stallion / Rutting in Mauritania. I carry in my blood a river of seeds / That can fertilize all the plains of Byzance / And the hills, the austere hills / I am the Lover and the locomotive with a well-oiled piston." (Excerpt translated from the French by Melvin Dixon)

3.1 Three neighbour comparisons: Socialism versus Western market economies

We begin with three illustrative comparisons: communist China versus capitalist Taiwan, socialist Czechoslovakia versus capitalist Austria, and socialist Yugoslavia versus capitalist Greece.[8] All three socialist/communist countries turned socialist following World War II with China developing its specific Maoist ideology, Czechoslovakia remaining in the Soviet sphere of influence except the short-lived Prague Spring in 1968, and Yugoslavia developing its own more decentralised version of socialism after breaking with the Soviet Union in 1948. In the west, Austria gradually re-established its pre-war market economy between 1946 and its eventual independence from Allied forces in 1955, Taiwan gradually transitioned from a mixed economy with an import-substitution policy towards free-market policies after the Kuomintang's retreat to Taiwan from the Chinese civil war in 1949, and Greece emerged as a Western economy after a violent civil war between communist forces and the Greek government between 1945 and 1949.

Figure 1 illustrates the economic development according to the Madison database since 1946 in all three country-pairs. The figure illustrates that by 1950, i.e., about the time when the regime differences between all three pairs were established, Taiwanese GDP per capita was already 83 % higher than in war-torn China while the Greek-Yugoslavian difference was 34 % and Austria was a mere 9 % richer than Czechoslovakia. Immediately before the war in 1937, the same differences were 114 %, 136 % and 15 %.

While China and Yugoslavia thus started the post-war period substantially poorer than their counterpart, the difference between Austria and Czechoslovakia was minor and it is likely that the Czech part of the country may have been richer than Austria.[9]

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[8] Communist China versus capitalist Taiwan is arguably the best-known example of a divided country, with the same history, culture, language and so on. Even the system of government was initially the same, as the republican government of China fled to Taiwan where it established its own republic after losing to Mao's communist forces. Similarly, Czechoslovakia was a part of the Austrian monarchy for three centuries up to 1918. Throughout the period, there were intensive economic, social and cultural relations, in particular, between Czech and Austrian regions. While the Yugoslav-Greek example is not as well known, the couple have similar characteristics with both Greece and the Kingdom of Serbia having been parts of the Ottoman empire and sharing religious and economic traits.

[9] The Czech part was significantly more developed than the Slovak part during the whole first half of the 20th century. For instance, in the 1920s, Slovakia had 23 % of the Czechoslovak population, yet only 8 % of its industrial production (Faltus and Průcha, 1999); moreover, the economic transition from an agrarian country started in Slovakia only in 1950 as against the Czech part where industry became the dominant sector already in 1900 (Musil, 1993). Through the 1930s, Czech life expectancy was approximately six years longer than Slovak life expectancy (Fialová and Šprocha, 2018). By 1948, Slovak national income per capita reached only 61 % of the Czech level (Bálek, 2007).

Figure 1. Three country-pairs, socialist versus capitalist
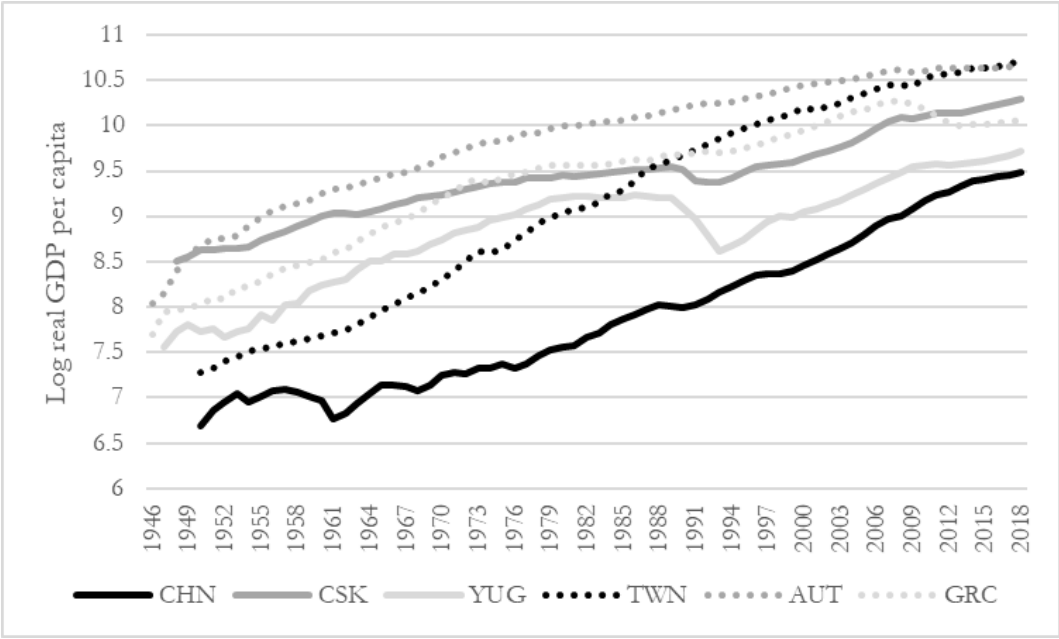
As illustrated in the figure, all three market economies clearly outperformed their socialist counterparts even though convergence dynamics would imply that China and Yugoslavia may have had larger growth potentials. Taiwan's annual growth rate between 1950 and 1990 was on average 2.7 percentage points higher than China's, Austria's was 1.6 percentage points higher than Czechoslovakia's, and Greece's was .7 percentage points higher than Yugoslavia's despite Greek instability, coups and a period of military dictatorship. An interesting detail is that economic volatility, as captured in the Madison dataset, was also lower in Taiwan than in China, and in Greece than in Yugoslavia despite their higher growth rates.[10] By 1990, when communism collapsed in Central Europe and China had been implementing market reforms for ten years, the Taiwanese-Chinese economic gap had widened to 431 %, the Greek-Yugoslav gap was 77 %, and the Austrian-Czechoslovak gap was 98 %. The Chinese and Central European experiences with socialism had been economically devastating.

However, it remains an open question if the examples of Maoist, Soviet and Soviet-derived economies do worse than the versions of socialism implemented in a series of developing countries from the 1960s and on. We next turn to making a similar type of neighbour comparisons for these countries.

3.2 Socialist economies and their neighbours in developing countries
In Figure 2, we plot GDP per capita in a group of 22 developing countries turning socialist against the simple average of GDP per capita in the geographical neighbours – countries with which a given country

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[10] The standard deviation of the growth rate is .066 in China versus .031 in Taiwan (p<.01), and .055 in Yugoslavia versus .035 in Greece (p<.01). Only the Austrian versus Czechoslovak volatilities appear similar (.022 versus 0.24; p<.51).

has a direct border. The full lines depict the GDP per capita of socialist countries as a share of that of their neighbours while the dotted depicts the corresponding share of neighbours' growth rates. The figure depicts relative GDP from a year prior to transitioning to socialism to ten years after.

Figure 2. Development under socialism relative to neighbours
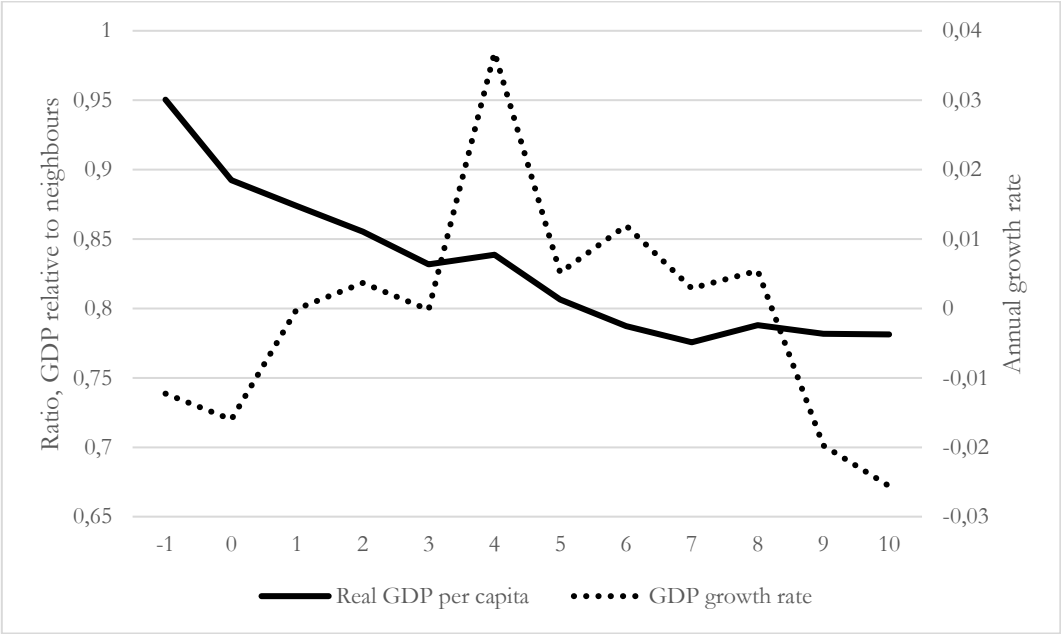
As the figure shows, while the average neighbouring country cannot be said to have done particularly well with an average annual growth rate of only .2 % during the first five years and a .5 % growth rate in the next five years, the averages for the countries that turned socialist are remarkably bad. On average, socialist developing countries grew -1.7 % per year in the first five years after introducing socialism, and a meagre .15 % during the next five years. In absolute terms, this implies an average loss during the first five years of almost 270 dollars per inhabitant. In relative terms, the neighbour comparison implies that developing countries that turned socialist became approximately 8 % poorer while their neighbours – *a priori* the most comparable societies – became about 4 % richer within five years after transitioning to socialism. While these differences are substantial, they are qualitatively similar to the Venezuelan experience of transitioning to socialism under Hugo Chavez. Assessing the growth costs of Venezuelan socialism, Grier and Maynard (2016) even find substantially larger losses than in our neighbour comparisons in developing countries.

3.3   Empirical analysis

While these comparisons are suggestive, this section instead provides standard econometric evidence on economic growth in socialist economies. Table 3 contains the results of a set of standard Barro-type growth regressions with annual and country fixed effects, which compare socialist countries with the rest of the world. In columns 1-4, the dependent variable is growth in average income measured using

purchasing-power adjusted GDP per capita. In columns 5-8, the dependent variable is labour productivity growth measured using GDP per full-time equivalent employee.

Table 3. Main results, full sample

	1	2	3	4	5	6	7	8
	GDP growth				Productivity growth			
Log initial GDP	-.029***	-.029***	-.029***	-.031***	-.037***	-.037***	-.037***	-.039***
	(.004)	(.004)	(.004)	(.004)	(.007)	(.007)	(.007)	(.007)
Investment price	.002	.002	.002	.002	.002*	.002	.002	.002
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Government spending	-.111***	-.112***	-.111***	-.105***	-.115***	-.116***	-.115***	-.112***
	(.021)	(.021)	(.022)	(.021)	(.023)	(.022)	(.023)	(.023)
Trade	.011***	.011***	.011***	.010***	.012***	.012***	.012***	.012***
	(.002)	(.002)	(.002)	(.002)	(.003)	(.003)	(.003)	(.003)
Log population	-.013**	-.013**	-.015***	-.013**	-.014**	-.013**	-.016***	-.016***
	(.006)	(.006)	(.006)	(.005)	(.006)	(.006)	(.006)	(.006)
Democracy	.006**	.006**	.007**	.008**	.005	.005	.006*	.007*
	(.003)	(.003)	(.003)	(.003)	(.004)	(.003)	(.004)	(.003)
Socialist	-.015**				-.017**			
	(.007)				(.008)			
Log time socialist		-.005				-.005		
		(.003)				(.003)		
Early socialist			-.022***	-.025**			-.025**	-.029**
			(.009)	(.009)			(.012)	(.012)
Late socialist			-.021**	-.025***			-.024**	-.028***
			(.008)	(.008)			(.009)	(.009)
Post-socialist, Soviet sphere				-.039***				-.023**
				(.007)				(.009)
Post-socialist, other				-.017***				-.019***
				(.006)				(.006)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10118	10118	10118	10118	9274	9274	9274	9274
Countries	181	181	181	181	180	180	180	180
Within R squared	.093	.092	.094	.102	.084	.084	.086	.089
F statistics	9.31	9.34	9.34	10.32	8.25	8.29	8.17	8.01

Note: *** (**) [*] denote significance at p<.01 (p<.059 [p<.10]. Numbers in parentheses are standard errors clustered at the country level.

First, the basic results for our control variables are in line with the standard findings in the vast growth literature: we find significant evidence of convergence effects, as initial GDP per capita or per employee is negative, negative effects of government spending, and positive effects of trade. We also find indications that democracies grow faster, although this is only significant for GDP per capita but not for labour productivity.

Turning to our main findings, we explore the effects of socialism measured as a simple dummy in columns 1 and 5, as the log to the number of years the country has been socialist, and as two dummies

capturing the first five years after turning socialist and the subsequent period of socialism. We find that on average, the simple measure in columns 1 and 5 is statistically significant and indicates that socialist developing countries on average grew 1.5 percentage points slower than comparable countries and had 1.7 percentage points slower growth in labour productivity. While the difference between the two estimates is not statistically significant, it is consistent with the general phenomenon in most socialist societies of substantial factor mobilisation.

Conversely, we find that the number of years the country has been socialist is never statistically significant. Yet, this may not be surprising if the effects of socialism are approximately linear and persistent. It is also consistent with our last finding, which indicates a linear effect of socialism: the estimates in which we separate the early years of socialism from the remaining period indicates that socialist developing countries in the first five years on average loose approximately 2.2 percentage points growth compared to non-socialist countries while the loss after five years on average is 2.1 percent. The corresponding estimates for labour productivity in column 7 indicate losses of about 2.5 and 2.4 percentage points, respectively.[11] Finally, when we also account for the well-known costs of transitioning out of socialist regimes, the corresponding estimates are 2.5 percentage points for both periods in column 4, and 2.9 and 2.8 percentage points for labour productivity in column 8. In addition, we document the costs of transitioning *out* of socialism by adding two dummies for the five years after transition from the Soviet sphere in Central and Eastern Europe and the Caucasus and for transitions out of socialism in the rest of the world. We estimate these costs to 3.9 and 2.3 percentage points for countries transitioning out of socialism from the Soviet sphere and 1.7 and 1.9 percentage points for other transitions out of socialism. Again, these differences are consistent with other evidence, as countries in the Soviet sphere in Europe and the Caucasus remained socialist for much longer than the rest, and experienced larger income declines during transition as a consequence of dismantling their comparatively large military-industrial complex (cf., Roaf et al., 2014).

However, comparisons that include both post-Soviet and post-socialist nations in Europe as well as other OECD countries may arguably be misleading when focusing on socialist growth in developing and middle-income countries. In Table 4, we therefore repeat all estimates but exclude all observations with a GDP per capita above 13,000 USD and all countries that were within the Soviet sphere. The cut-off is approximately consistent with the World Bank definition of developing and middle-income countries and is thus a conservative choice.

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[11] Separating the first five years from the remaining socialist period is meaningful and potentially important for two reasons. First, a substantial institutional change towards poor protection of private property and more government intervention is likely to increase the size of the shadow economy (cf. Dreher et al., 2014). While this may lead to underestimation of GDP growth, we would expect the change to be phased in during the first years after transition such that the problem mainly applies to the first period. Second, one could also expect an exuberance effect if, for example, some organisations and people are at first excited by the change. Again, this potential effect would primarily be pertinent in the first period after transition.

Table 4. Results, only developing and middle-income countries

	1	2	3	4	5	6	7	8
	GDP growth				Productivity growth			
Log initial GDP	-.019***	-.029***	-.019***	-.020***	-.024***	-.024***	-.024***	-.025***
	(.005)	(.005)	(.005)	(.005)	(.007)	(.007)	(.007)	(.007)
Investment price	.001	.001	.001	.001	.001	.001	.001	.001
	(.001)	(.001)	(.001)	(.002)	(.002)	(.002)	(.002)	(.002)
Government spending	-.065***	-.067***	-.064***	-.066***	-.072***	-.073***	-.071***	-.072***
	(.017)	(.017)	(.018)	(.018)	(.021)	(.021)	(.021)	(.022)
Trade	.012**	.012***	.012**	.012**	.012**	.012**	.012**	.012**
	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)
Log population	-.020*	-.019*	-.020*	-.022**	-.022*	-.022*	-.022***	-.023**
	(.011)	(.012)	(.011)	(.012)	(.013)	(.013)	(.013)	(.013)
Democracy	.006*	.006**	.006*	.006**	.003	.003	.004	.004
	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)	(.003)
Socialist	-.020**				-.022**			
	(.008)				(.010)			
Log time socialist		-.007*				-.007		
		(.004)				(.005)		
Early socialist			-.024**	-.027***			-.029**	-.032**
			(.009)	(.010)			(.013)	(.013)
Late socialist			-.020**	-.024***			-.021**	-.025**
			(.008)	(.009)			(.009)	(.009)
Post-socialist, other				-.014**				-.013**
				(.006)				(.006)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6151	6151	6151	6151	5457	5457	5457	5457
Countries	133	133	133	133	130	130	130	130
Within R squared	.053	.052	.054	.055	.057	.056	.058	.059
F statistics	11.78	12.08	11.66	11.36	8.52	8.65	8.24	8.13

Note: *** (**) [*] denote significance at p<.01 (p<.059 [p<.10]. Numbers in parentheses are standard errors clustered at the country level.

Despite the smaller sample and arguably better comparison, the findings in Table 4 reflect those obtained with a full sample in Table 3. We find annual losses in income growth per capita around 2–2.5 percentage points, and somewhat larger losses in the growth rate of labour productivity. Although we cannot reject that the effects are the same, the estimates indicate that the productivity losses are largest in the early years of a socialist regime. These estimates indicate sizable losses in income and human welfare from implementing a socialist economy in a developing country. The estimates imply that in the typical country in our sample that turns socialist, the accumulated loss over the first five years is lost growth amounting to almost 400 USD per inhabitant and more than twice that amount in lost labour productivity. As such, these estimates are somewhat larger but broadly consistent with our neighbour comparisons.

Finally, we report our placebo tests, which we think of as a way of intuitively testing the endogeneity bias in estimates in Tables 3 and 4. To recap, we assign socialism to the 'wrong' country, defined as the

neighbouring country without a socialist present or future in which the growth path prior to socialism is most similar to the actually socialist country. We report estimates for GDP per capita in columns 1 and 2, and for labour productivity in columns 3 and 4; odd-numbered columns apply the full sample while even-numbered columns apply the restricted sample as in Table 4.

Table 5. Results, placebo tests

	1	2	3	4
	GDP growth		Productivity growth	
	Full sample	Developing and middle-income	Full sample	Developing and middle-income
Log initial GDP	-.031***	-.019***	-.039***	-.024***
	(.005)	(.005)	(.007)	(.007)
Investment price	.002	.001	.001	.001
	(.001)	(.002)	(.001)	(.002)
Government spending	-.109***	-.072***	-.117***	-.079***
	(.021)	(.017)	(.022)	(.019)
Trade	.011***	.013***	.012***	.013**
	(.002)	(.005)	(.003)	(.005)
Log population	-.012**	-.019*	-.014**	-.020
	(.006)	(.012)	(.006)	(.013)
Democracy	.009***	.007**	.008**	.005
	(.003)	(.003)	(.004)	(.004)
Early socialist, placebo	-.004	-.011	.003	-.004
	(.011)	(.011)	(.009)	(.009)
Late socialist, placebo	-.001	-.008	-.002	-.012
	(.009)	(.009)	(.011)	(.011)
Post-socialist, other	-.009*	-.006	-.011*	-.005
	(.006)	(.005)	(.006)	(.006)
Country FE	Yes	Yes	Yes	Yes
Annual FE	Yes	Yes	Yes	Yes
Observations	10118	6151	9247	5457
Countries	181	133	180	130
Within R squared	.098	.051	.085	.055
F statistics	10.75	12.48	8.16	11.23

Note: *** (**) [*] denote significance at p<.01 (p<.059 [p<.10]. Numbers in parentheses are standard errors clustered at the country level.

Our placebo tests yield generally small and insignificant estimates, which we take as an indication that our estimates in Tables 3 and 4 are likely to be causal. The placebo estimates are also significantly different from those in earlier tables, although occasionally only at p<.10. As such, we find no indications that the effects we identify are reflections of region or geography-specific trends or development that is common to the most similar neighbours.

While this test is indicative but cannot establish causality with certainty, we note as a final point that most sources of endogeneity bias would result in rather conservative estimates. The same holds true for the problems associated with measuring the value of output and consumption in fully socialist economies, as well as measurement problems associated with the incentives of autocratic regimes (cf. Magee and Doces, 2015). We also note that the findings are not primarily driven by factor mobilisation or increased government spending. Although the Soviet Union grew in the 1930s and 1940s by, among other things, bringing many more women into the labour force, this cannot be a relevant mechanism

here. If labour mobilisation was a main driver, we would have seen smaller effects on labour productivity whereas we actually observe larger effects.

Where we find any effects of introducing socialism on investment rates or government spending, these effects appear relatively small (appendix Table A5). The exception is when we use the index of state ownership (where full state ownership is coded as 0 and no ownership as 4) in the appendix, which we think of as a 'smell test' of our coding of socialism. We find that socialism is associated with almost an entire standard deviation increase in state ownership, thereby validating our coding based on actual policy choices. As our main results are also robust to a set of further tests including deleting single countries (see appendix Figure A2), varying the sample and adding more control variables (available upon request), we turn to discussing their overall economic and political relevance.

Conclusions

When socialism collapsed in Central and Eastern Europe around 1990, the economic and social consequences of socialism appeared evident: Western Europe had grown much richer and democracy was more stable than the countries that had been in the Soviet sphere of influence. However, many academics and politicians have since argued that the experience behind the Iron Curtain was not representative of socialism, and socialist ideas and policies have become substantially more popular in recent years.[12] The renewed interest in socialist and Marxist thought and economic policy thus begs the question we ask in this paper: what are the economic growth consequences of implementing a socialist economy?

We both provide neighbour comparisons from three well-known pairs of countries as well as from 22 developing countries that turned socialist from the late 1950s and on, as well as standard econometric evidence. In all cases, we find substantial costs of implementing socialism: our best estimates of the growth loss associated with socialism indicate that socialist countries grow approximately 2–2½ percentage points slower, in terms of real GDP per capita, than comparable countries. Comparing growth in labour productivity yields comparable but slightly larger losses. As set of simple but intuitive placebo tests also indicate that the estimates are likely to be causal, and even if not, we note that the endogeneity bias works against finding clear effects of socialism. As the growth performance of comparable developing countries was far from stellar during the years in which these countries turned socialist, our estimates imply that in most socialist developing countries, the broad population effectively became poorer each year the country remained socialist.

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[12] Niemitz (2019) discusses the way these examples were described over time by Western academics, and how each of his examples went through a period of political promise with subsequent disappointment of their actual economic performance.

Whereas we cannot inform of the specific mechanisms through which the implementation of full-blown socialism works, we note that some mechanisms are inconsistent with our findings. For example, it has been argued that the Soviet Union grew relatively quickly in the 1930s due to substantial factor mobilisation and investments, and subsequently suffered a productivity decline as centralised investment decisions were unprofitable and as resources were diverted away from research and development towards the military (Allen, 2001). However, this seems not to be the case in our sample of developing countries where, if anything, investment rates declined along with productivity. The relatively small (and insignificant) difference between our growth estimates for GDP per capita and labour productivity also indicates otherwise. One could also suspect that part of the decline occurred because major parts of the economy moved underground when socialist policies were implemented. However, this would imply larger measured growth effects in the first years of socialism while we find similar effects after the first five years. As in Olson (1996), we therefore believe that the main explanation is the implementation of socialist policies that were disastrous to productivity. With few exceptions – most notably Botswana and the South East Asian Tigers – the vast majority of developing countries were characterised by poor judicial institutions, corruption and strongly illiberal policies. The group of countries, which we compare socialist societies to, were therefore not exactly economically free, enjoying inclusive institutions, or respectful of citizens' democratic rights. That we continue to find substantial, negative effects of implementing full socialism attests to the very specific nature of such policies.

Overall, we document that implementing a socialist economy in developing countries has had dire economic and social consequences. Although charismatic African socialist leaders such as Ghana's Kwame Nkrumah and Tanzania's Julius Nyerere promised that socialism would be a fast track to prosperity and justice, theirs was a false hope. As in other parts of the world, our findings lend credence to the conclusion that full-blown socialism is universally associated with substantial economic failure and human misery.

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Appendix A: Measuring socialism

A first major empirical challenge is to measure adequately when a country is *de facto* a socialist or communist planned economy. Here, we briefly explore three different approaches. A first option is to code parties according to their official political ideology, using either expert coding or content analysis of party manifestos. The second option is to code whether a country is defined as socialist by its constitution, i.e., whether the country is *de jure* socialist or communist. The third option, which we follow in this paper, is to rely on the official definition of the country and its basic policy choices. Each of these options represent significant coding challenges and, as we show in the following, also differ substantially when applied empirically.

There are well-known problems with identifying party ideology (cf., Osterloh, 2012; Bauer et al., 2017; Bjørnskov and Rode, 2019). While several studies employ expert coding of parties in order to obtain measures of government ideology, they are problematic in this context as communist or unreformed socialist parties represent extreme positions in modern party spectra. Separating these parties from other left-wing parties with less extreme positions on economic policy and preferences for democracy is thus rarely done. The alternative way of placing parties on an ideological scale in which the coding relies on content analysis of party manifestos also remains problematic for the same reason (cf., Gabel and Huber, 2000). In addition, any practical application of manifestos data necessarily faces the problem that what is included in party manifestos reflects salient issues at the time of writing instead of actual policy choices or preferences that may often occur years after the manifesto was written. Identifying socialist societies through coding party ideology therefore remains problematic.

Turning to measuring whether a country is socialist by how the system is coded in the constitution, we face two major problems. First, a substantial literature in constitutional political economy has documented how *de jure* rights and constraints defined in the constitution differ substantially from the *de facto* situation and what is actually enforced (cf., Law and Versteeg, 2013; Voigt, 2021). Second, new constitutions are only infrequently implemented or substantially amended in most parts of the world and when they are, they often reflect regime changes that occurred sometime prior to the constitutional change. For example, while North Vietnam had been communist since 1945, it was only after the end of the Vietnam War that the country officially changed its name to the Socialist Republic of Vietnam. Similarly, although the Republic of Congo became a socialist economy after the 1968 military coup and was subsequently renamed the People's Republic of Congo, it only became formally defined as socialist by the constitution in 1979. Conversely, Portugal has been constitutionally defined as a socialist society since democratisation in 1975 but has continued to be a

modern market economy until today. Relying on constitutional definition thus implies both false positive and false negative identification of whether a society is *de facto* socialist.

We therefore rely on the third option, which consists of coding a society as socialist if the executive branch (i.e. the part of government that enforces law) identifies the state as such, and if its policy choices are consistent with a socialist planned economy in which most means of production are nationalised. One such case, the Derg – the military junta that ruled Ethiopia from 1974 until the late 1980s – provides a clear example, as the organisation rapidly implemented a Marxist-Leninist single-party state broadly along the lines of the Soviet Union. Although Ethiopia's constitution did not define it as a socialist economy before 1987, Derg policy under the leadership of Mengistu Haile Mariam included large-scale nationalisation of industry and much urban real estate, and substantial land redistribution. While this option implies that we are only identifying very clear examples of socialist societies, including Ethiopia during the Derg period, Nicaragua under the Sandinista government in the early 1980s, and most obviously communist China, this provides a conservative coding of socialism and thus a minimal risk of overidentifying consequences of socialism. Treating socialism as a dichotomous measure the way we do simplifies the definition procedure, but obviously potentially ignores information if countries are socialist to varying degrees. On the other hand, creating a continuous measure of socialism introduces new problems that have been discussed extensively in the literature on economic freedom (e.g., Berggren 2003; Hall and Lawson 2014).

We show in Tables A1a-c that this choice is consequential by comparing empirical examples of the three approaches. As our example of expert coding, we define a society as socialist if the executive's party is defined as left-wing in the Database of Political Institutions (DPI), and either holds at least 75 % of seats in parliament or rules the country without a parliament (Cruz et al., 2021). Our example of socialism as defined by the constitution derives from the Comparative Constitutions Project (CCP), which provides a direct indicator of whether the constitution does so (Elkins et al., 2009).[13] Finally, we employ the *de facto* indicator capturing whether the country was officially a socialist or communist planned economy, based on whether most means of production were nationalised and centrally controlled, from Bjørnskov and Rode's (2020) update and expansion of the Democracy and Dictatorship dataset.

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[13] In the relatively few cases in which a new constitution was implemented after 2009, we update the data by coding the new constitutions in the same way as in Elkins et al. (2009). In addition to the three indicators explored here, Manzano (2007) also provides an indicator of socialism. However, her indicator is available for considerable fewer country-years than the three chosen here, and moreover tends to be consistent with the indicator backed out of the Database of Political Institutions.

Table A1a. Discrepancies between Bjørnskov-Rode and CCP

		Bjørnskov-Rode	
		Not socialist	Socialist
CCP	Not socialist	11680	326
		(82.6 %)	(2.3 %)
	Socialist	608	1535
		(4.3 %)	(10.8 %)

Table A1b. Discrepancies between Bjørnskov-Rode and DPI

		Bjørnskov-Rode	
		Not socialist	Socialist
DPI	Not socialist	6478	431
		(82.1 %)	(5.5 %)
	Socialist	450	527
		(5.7 %)	(6.7 %)

Table A1c. Discrepancies between CCP and DPI

		CCP	
		Not socialist	Socialist
DPI	Not socialist	6170	465
		(77.9 %)	(5.9 %)
	Socialist	761	515
		(9.6 %)	(6.5 %)

As is clear from the tables, there are both large overlaps but also large discrepancies between the three indicators. While the CCP and the Bjørnskov-Rode (BR) indicators agree on 1511 observations, the former codes an additional 632 country-years as socialist while the latter codes 313 additional country-years as socialist. Some of the discrepancies are due to timing differences, but others arise from the false positives and negatives inherent in the constitutional definition of socialism. The discrepancies when using the DPI indicator relatively to both the CCP and BR indicators are substantially larger and includes both types. As reported in the appendix, these discrepancies for example include Tanzania in the period 1975–1984, which BR codes as socialist but the DPI does not, and Burkina Faso between 1981 and 1991, which neither BR nor CCP code as socialist but which DPI does.

The BR indicator is illustrated in Figure A1. The figure clearly shows how the share of countries in the world that were socialist increased during the 1960s and 1970s, as newly independent countries turned to socialism, and peaked around 1980. The figure also very clearly illustrates the dramatic collapse of socialism worldwide in the early 1990s when not only Central and Eastern Europe, but also a number of developing countries aligned with the Soviet Union, turned away from socialism. That is the broad development that provides our identification of the consequences of socialism in the following.

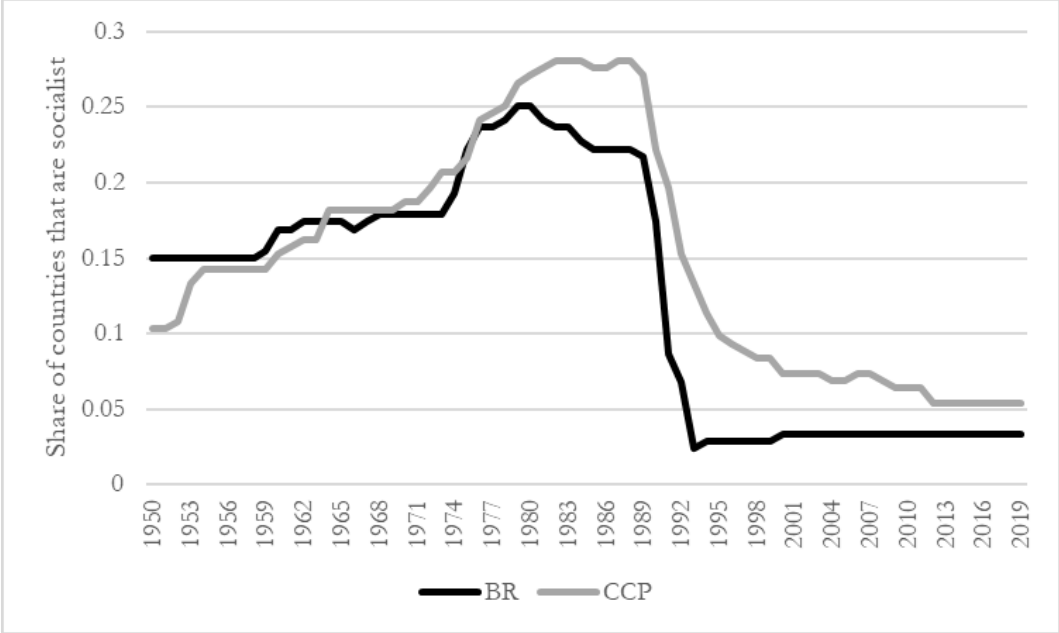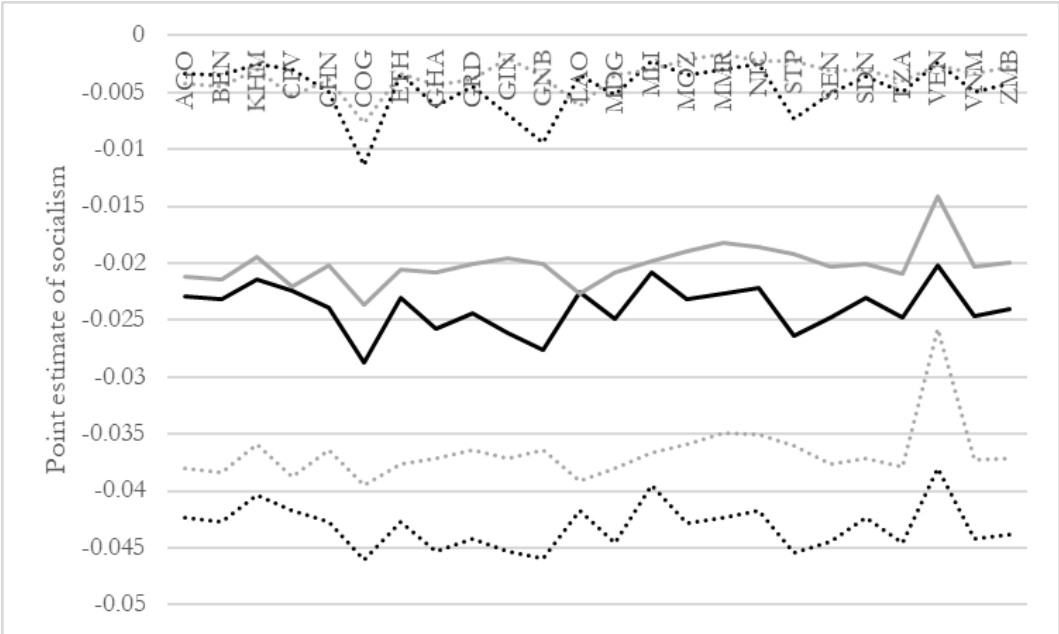Figure A1. Socialist share across the world, 1950–2019

Figure A2. Summary of jackknife test

Note: full lines denote the estimates for the early period (black) and late period of socialism (grey) while dotted lines denote the 95 percent confidence intervals. Excluded countries are denoted along the x-axis.

Table A2. Discrepancies between Bjørnskov-Rode and CCP, all cases

	BR over CCP		CCP over BR
Country	Period	Country	Period
Afghanistan	1978–1979	Albania	1991–1997
Afghanistan	1990–1991	Armenia	1991–1994
Belarus	1994–2019	Azerbaijan	1993–1994
Benin	1974–1975	Bangladesh	1972–1975
Bulgaria	1950–1960	Bangladesh	1981–2019
China	1950–1953	Belarus	1991–1993
Cuba	1960–1975	Bosnia and Herzegovina	1991–1994
Ethiopia	1975–1986	Cambodia	1982–1989
Ghana	1960–1963	Croatia	1990–1996
Grenada	1979–1983	Egypt	1964–2011
Guinea	1959–1981	Ghana	1966–1968
Guinea–Bissau	1974–1980	Guyana	1970–2019
North Korea	1950–1953	Hungary	2011–2019
Laos	1976–2019	India	1992–2019
Mali	1960–1968	Iraq	1964–1989
Mongolia	1950–1959	Libya	1969–2010
Nicaragua	1979–1989	Burma (Myanmar)	1963–1973
Poland	1950–1951	Myanmar	1989–2008
Senegal	1962–1980	Nepal	2006–2007
Serbia	1950–1952	Poland	1990–1991
Somalia	1970–1978	Portugal	1976–2019
Sudan	1969–1972	Rwanda	1973–1990
Tanzania	1967–1976	Serbia and Montenegro	1990–1999
Venezuela	2000–2019	Seychelles	1979–1992
Zambia	1968–1989	Somalia	1991–2003
		Sri Lanka	1972–2019
		Syria	1964–2011
		Tanzania	1985–2019
		Ukraine	1991–1995
		Vietnam	1960–1974
		Yemen	1978–1993

Note: 'X over Y' means cases in which dataset X codes a country as socialist while dataset Y does not.

Table A3. Discrepancies between Bjørnskov-Rode and DPI

| | BR over DPI | | DPI over BR |
Country	Period	Country	Period
Afghanistan	1989–1991	Algeria	1975–1992
Belarus	1994–	Angola	1991–1992
Nicaragua	1979–1989	Angola	2009–2017
Tanzania	1975–1984	Argentina	1975–1976
Venezuela	2000–	Barbados	1975–1976
		Barbados	1998–2008
		Belarus	1992–1993
		Benin	1990–1991
		Benin	1994–1995
		Burkina Faso	1981–1991
		Cambodia	1982–1993
		Cape Verde	1976–1991
		Republic of Congo	1998–2002
		Ethiopia	1991–1995
		The Gambia	1975–1984
		The Gambia	1988–1992
		Ghana	1993–1996
		Guinea–Bissau	1981–1994
		Guyana	1981–1992
		India	1988–1989
		Jamaica	1975–1980
		Jamaica	1994–2002
		Lesotho	1994–2002
		Liberia	1976–1980
		Libya	1977–2010
		Mexico	1975–1979
		Mongolia	1992–1993
		Mozambique	1991–1994
		Mozambique	2010–2014
		Namibia	2000–
		Nicaragua	2017–
		Pakistan	1975–1977
		Portugal	1975–1976
		Senegal	1981–1992
		Sierra Leone	1975–1992
		Solomon Islands	1982–1984
		St. Lucia	1998–2006
		Tajikistan	1993–1995
		Tajikistan	2006–
		Tanzania	2001–2010
		Trinidad and Tobago	1987–1991
		Tunisia	1975–2011

Turkmenistan	1993–2013
Uzbekistan	1993–1995
Vanuatu	1989–1991
Zambia	1990–2001

Note: 'X over Y' means cases in which dataset X codes a country as socialist while dataset Y does not.

Table A4. Neighbours of socialist countries in sample

Country	Neighbours	Country	Neighbours
Angola	DR Congo, Rep. of Congo, Namibia, Zambia	Mali	Algeria, Burkina Faso, Côte d'Ivoire, Guinea, Mauritania, Niger, Senegal
Benin	Burkina Faso, Niger, Nigeria, Togo	Mozambique	Eswatini, Madagascar, Malawi, South Africa, Tanzania, Zambia, Zimbabwe
Cambodia	Laos, Thailand, Vietnam	Myanmar	Bangladesh, China, India, Laos, Thailand
Rep. of Congo	Cameroon, Central African Rep., DR Congo, Gabon	Nicaragua	Costa Rica, Honduras
Ethiopia	Djibouti, Kenya, *Somalia,* Sudan, Yemen	Sao Tomé and Principe	Equatorial Guinea, Gabon
Ghana	Burkina Faso, Côte d'Ivoire, Togo	Senegal	The Gambia, Guinea, Guinea-Bissau, Mali, Mauritania,
Grenada	Barbados, Saint Vincent and the Grenadines, Trinidad and Tobago, Venezuela	Sudan	Chad, Egypt, Ethiopia, Kenya, Libya, Saudi Arabia, Uganda
Guinea	Côte d'Ivoire, Guinea-Bissau, Liberia, Mali, Senegal, Sierra Leone	Tanzania	DR Congo, Burundi, Kenya, Malawi, Mozambique, Rwanda, Uganda, Zambia
Guinea-Bissau	Guinea, Senegal	Venezuela	Brazil, Colombia, Guyana, Trinidad and Tobago
Laos	Cambodia, China, Myanmar, Thailand, Vietnam	Vietnam	Cambodia, China, Laos
Madagascar	Comoros, Mauritius, Mozambique	Zambia	Angola, Botswana, DR Congo, Malawi, Mozambique, Tanzania, Zimbabwe

Note: Somalia (in italics) is listed as a neighbouring country but has no available data.

Table A5. Investment rates and government spending

	1	2	3	4	5	6	7	8	9	10	11	12
	Investment rates (% of GDP)				Government spending (% of GDP)				State ownership			
Log initial GDP	.023* (.012)	.022* (.012)	.033** (.014)	.034** (.014)	-.024* (.013)	-.024* (.013)	-.010 (.014)	-.012 (.014)	-.068 (.061)	-.073 (.061)	-.028 (.067)	-.031 (.067)
Investment price	-.027*** (.007)	-.023*** (.008)	-.023*** (.008)	-.023*** (.008)								
Government spending	.197 (.158)	.110 (.093)	.110 (.093)	.112 (.094)								
Trade	.102*** (.024)	.101*** (.024)	.212*** (.043)	.212*** (.043)	.094*** (.011)	.094*** (.011)	.129*** (.022)	.129*** (.022)	-.010 (.045)	-.011 (.045)	.035 (.039)	.035 (.039)
Log population	.069*** (.025)	.071*** (.026)	.012 (.029)	.014 (.029)	-.008 (.017)	-.012 (.017)	-.071** (.032)	-.073** (.032)	.246** (.121)	.244** (.125)	.054 (.196)	.050 (.196)
Democracy	-.005 (.009)	-.005 (.009)	-.009 (.008)	-.010 (.008)	.002 (.008)	.001 (.008)	.001 (.009)	.011 (.009)	.335*** (.065)	.337*** (.065)	.202*** (.053)	.203*** (.053)
Early socialist	-.055*** (.018)	-.053*** (.019)	-.035* (.019)	-.030 (.020)	.041* (.024)	.036 (.027)	.037 (.023)	.033 (.025)	.765*** (.127)	.779*** (.133)	.755*** (.130)	.764*** (.138)
Late socialist	-.067*** (.018)	-.065*** (.019)	-.048*** (.017)	-.042** (.019)	.052* (.029)	.047 (.031)	.057** (.029)	.052 (.032)	.794*** (.124)	.808*** (.126)	.739*** (.131)	.749*** (.135)
Post-socialist, Soviet sphere		-.027** (.013)		-		.052*** (.016)		-		-.079 (.128)		-
Post-socialist, other		.009 (.018)		.021 (.017)		-.020 (.018)		-.018 (.019)		-.075 (.089)		-.038 (.092)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10118	10118	6151	6151	10118	10118	6151	6151	9118	9118	5686	5686
Countries	181	181	133	133	181	181	133	133	160	160	119	119
Within R squared	.465	.466	.611	.612	.451	.457	.440	.441	.469	.469	.474	.474
F statistics	19.92	19.28	15.53	15.60	30.30	28.74	9.35	9.04	9.43	9.93	20.08	20.98

Note: *** (**) [*] denote significance at p<.01 (p<.059 [p<.10]. Numbers in parentheses are standard errors clustered at the country level.

Figure 3. Development under socialism, two examples