The Changing Public–Private Infrastructure Mix: Economy-wide Implications

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This article provides an economy-wide perspective on the changing role of the public sector in developing economic and social infrastructure in Australia. It analyses the scale and macroeconomic significance of the key economic and social infrastructure sectors — communication services, electricity, gas and water supply, transport, education, health and community services, government administration and defence. It then canvasses the major policy issues that have arisen in the progression from public to private infrastructure provision and considers why concerns about the trend fall in traditional public works spending may be misplaced in light of recent economic and institutional changes.

The public sector in Australia retains major responsibility for providing and maintaining the nation's infrastructure. However, over recent decades there has been a marked decline in public sector capital spending relative to GDP, in line with trends in other advanced economies. At the same time, the private sector has become much more involved in infrastructure provision. This article aims to highlight key features of the changing public–private infrastructure mix and address its significance from a uniquely economy-wide or macroeconomic perspective.

An economy's infrastructure and the services it generates are central to overall economic performance and living standards. Basic economic infrastructure is highly capital intensive and long-lived and includes roads, railways, ports and airports and services such as electric power, gas, telecommunications, sanitation and water. Infrastructure can be even more broadly defined to include facilities that assist in the provision of social services such as education, healthcare, childcare, police and prison services.

Historically, the public sector has been the main provider of infrastructure in Australia because of the sheer scale of many projects and the natural monopolies that arise from increasing economies of scale. Other characteristics of infrastructure include the essential nature of many services and their externality effects. Indeed many essential infrastructure industries in Australia began as government-owned monopolies, operating as government departments. Through time, the management orientation of these industries has shifted from bureaucratic to market responsive.

Given the three-tiered structure of government, and an array of ideological perspectives, it has proven difficult to reach a consensus on whether the public or private sector should primarily own the infrastructure. The Australian Constitution specifies that the federal government is responsible for postal and telecommunications services. Public enterprises, such as Telstra (now partly privatised) and Australia Post, along with private enterprises meet the demand for these services. In Australia's federal system, the central government also has responsibility for regulating air transport infrastructure and services, whereas the state governments deliver the bulk of remaining infrastructure services including ports, rail, roads, gas, electricity and water services.

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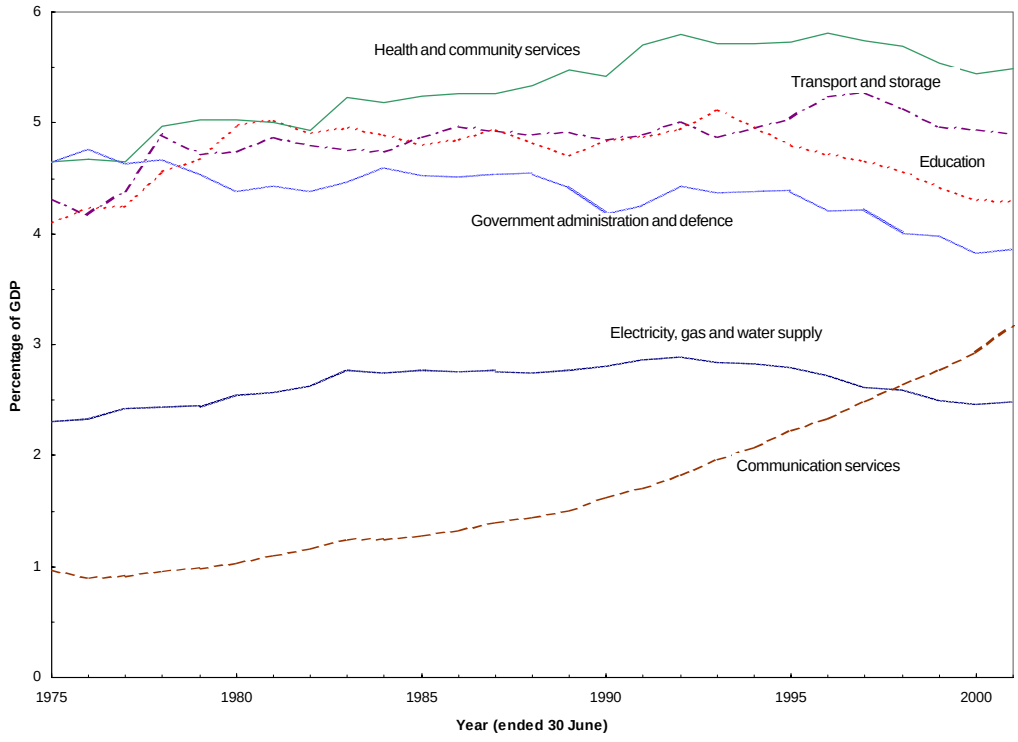
The federal government is also a major source of funding for state and local infrastructure investment through payment of general and specific purpose finance for roads and for social infrastructure, such as education and healthcare. State governments also approve and manage infrastructure provision and are major owners of road and rail transport infrastructure assets. The local government sector has varying degrees of responsibility for infrastructure across states, playing a significant role in providing urban and rural infrastructure in the form of water supply, sanitation, land-use planning and local road networks.

Since the early 1990s the private sector has significantly increased its participation in providing infrastructure services at the federal, state and local government levels. This has involved a range of public–private sector arrangements including limited privatisation of public infrastructure assets and the use of market mechanisms such as contracting out and application of the 'user pays' principle.

The remainder of this article examines the causes and economy-wide consequences of the diminished role of the public sector in providing infrastructure in Australia. First, the scale and macroeconomic significance of the key infrastructure sectors are analysed. Next the main policy issues that have arisen in the progression from public to private infrastructure provision are discussed. The next section considers why concerns about the trend fall in traditional public capital spending may be misplaced in light of recent economic and institutional changes. The final section summarises and concludes the paper.

The Macroeconomic Significance of Infrastructure

Australia's national accounts provide value added, investment and capital stock data on the following infrastructure-based industries: communication services, electricity, gas and water supply, transportation and storage (economic



Source: Australian Bureau of Statistics, National Accounts, various.

Figure 1: Gross Production (Percentage of GDP), by Infrastructure Sector

infrastructure industries), as well as education, health and community services and government administration and defence (social infrastruture).

Figure 1 reveals that of these sectors, the contributions of transport and storage, health and community services and communication services (including information and communication technology (ICT)) have increased over the past 30 years, whereas the relative shares of education, government administration and defence and electricity, gas and water in GDP remained relatively stable.

The communication services sector has grown most rapidly over recent decades, albeit from a low starting base, to reach around 3 percent of GDP. This reflects the high usage of ICT services by Australian business and households, well above average OECD levels, with three-quarters of all businesses using computers, most with Internet access. According to the 2001 IDC Information Society Index, which ranks countries by capacity to access and absorb information and information technology, Australia is ranked eighth in the world in general terms and third, after Sweden and Singapore, in the subcategory of computer and Internet infrastructure.

Meanwhile, traditional infrastructure like roads and rail remain important for many of Australia's commodity-export industries. For instance the agricultural and mining sectors produce significant exports of bulk commodities including wool, wheat, beef, coal, bauxite/alumina, crude oil and iron ore, whose economic viability depend on transport costs. Efficient infrastructure is important for maintaining international competitiveness and for participating in and reaping the rewards of international trade.

The Changing Public–Private Infrastructure Mix

From the mid-1980s there was general agreement that considerable scope existed for improving the efficiency of infrastructure service delivery. Motivated by a perceived need to bolster overall economic performance, there has been widespread economic reform in Australia that has had a major impact on the provision of infrastructure services. Though microeconomic in nature, the reform essentially had a macroeconomic purpose, to raise growth.

During the 1980s most public enterprises providing infrastructure services were 'corporatised', meaning they were required to operate where possible along commercial lines. Through cost reductions, this initially improved efficiency, lowered the real prices of services to consumers and significantly raised the return on public capital. However, by the early 1990s the performance of public enterprises was showing little further improvement, suggesting the need for further reform including privatisation.[1]

Full development, ownership and control of infrastructure by the government sector is one end of a spectrum of private–public sector possibilities for delivering infrastructure services. At the other end of the spectrum is full privatisation without regulation. Numerous reasons have been proposed for privatisation including higher government revenue, greater sectoral competition and efficiency, reduced government interference and enhanced share ownership.[2]

The rationale for privatisation is strong for state-owned enterprises, though not for public goods and natural monopolies where competition is weak. Privatisation of public infrastructure has not, however taken, place on the same scale in Australia as it has in the UK and New Zealand, mainly because the Australian electorate has been more reluctant to endorse widespread privatisation of state enterprises and more extensive outsourcing of government services. From the investors' perspective, infrastructure investment entails additional risks, given the limited alternative uses for large-scale infrastructure assets and the regulatory risk that arises because regulations in place at the time of initial investment may change.

Since the early 1990s around $70 billion worth of public infrastructure has passed to the private sector as a result of privatisations including major capital city airports, power stations, ports, rail freight and gas transmission and distribution. Most of the privatisation has been of assets previously fully owned by the federal government (Commonwealth Bank, Qantas and Telstra) and the state government of Victoria (Victorian Electricity and Railways). These privatisations have generally improved efficiency, innovation and financial outcomes, consistent with previous international experience.[3]

There have, however, been significant differences across the individual states in policies toward privatisation of public infrastructure assets and the nature of partnerships

between government and the private sector. Nonetheless, all levels of government in Australia have accepted a need for the private sector to play a greater role in the development and delivery of infrastructure.

There was also recognition of salutary lessons from the UK and New Zealand experience of large-scale privatisations that privatisation *per se* did not necessarily bestow efficiency gains and lower prices if it simply entailed transferring monopoly powers from the public to the private sectors. Accordingly, the focus shifted from the increasingly ideologically charged question of the ownership of infrastructure capital to the quality of infrastructure service delivery.

In 1995, the Council of Australian Governments agreed to a National Competition Policy (NCP) that required the adoption of methods to intensify competition in infrastructure industries, subject to a public benefit test. NCP had several dimensions, including the extension of the competition provisions of the *Trade Practices Act 1974* to every business and profession, the removal of sovereign immunity for government business activities and the application of competitive neutrality principles to government monopolies.

The key aspect of NCP that affected infrastructure was the establishment of a legislative regime to facilitate third-party access to so-called 'essential facilities' that exhibit natural monopoly characteristics, in the sense that it is only efficient for one facility to operate in the market. Examples include electricity transmission grids, telecommunications networks, gas and water pipelines, railroad terminals and tracks, airports, ports and wharves.

Access to such facilities is essential for effective competition in upstream or downstream markets, but could not be assured when the owner of the facility had monopoly power over whether, and at what price, access will be granted and used this monopoly power to derive monopoly profits at the expense of consumers and economic efficiency.

There are in reality many alternatives to privatisation that permit private–public sector partnerships. Infrastructure financing and operation by the private sector has been greatest in the deregulated industries, such as electricity generation where new generating capacity is now largely the responsibility of the private sector. There has also been some experience with private operation of toll roads, water treatment plants and prisons. Direct private sector involvement in areas such as developing urban public transport, regional highways and regional communications networks has, however, been minimal. At the same time, governments are interested in extending private sector involvement to include social infrastructure services in the fields of health and education.

The largest states, Victoria, NSW and Queensland, explicitly recognise the importance of public–private partnerships (PPPs) in service delivery. Through partnerships, governments obtain significant benefits through risk transfer and through use of private sector management skills and innovations. In practice, PPPs operate such that the public sector is responsible for strategic planning, core service delivery, regulation and consumer protection, while the private sector designs, constructs, operates, maintains and finances service delivery and manages the risk. Smaller states are presently considering new policy in this area, and are expected to follow in due course.

At the local government level, private sector involvement has increased through the contracting out of services such as office cleaning, park maintenance and refuse collection.

Is Lower Public Spending on Traditional Infrastructure a Concern?

The national accounts measure of public capital expenditure, much of which is on traditional infrastructure, has declined over recent decades, as shown by the downward trend of total public capital spending in Figure 2.

Of itself, this may suggest that public infrastructure spending needs boosting through fiscal expansion at the federal and state levels. Moreover, in the spirit of the Keynesian macroeconomic paradigm, some economists have argued for increased government capital spending on the basis of empirical studies of the economy-wide effects of public infrastructure.[4]

These studies have implied that higher public infrastructure expenditure, particularly on ports, roads, airports, electricity provision, water systems, highways, bridges and airports raises labour productivity and multifactor productivity, thereby inducing more private invest-

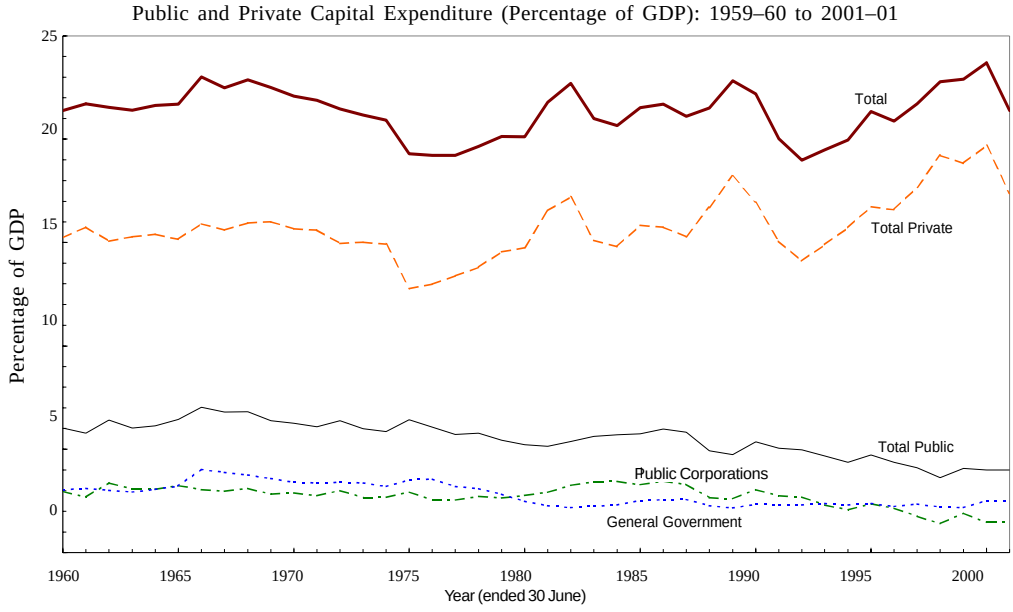
ment in the economy. In Australia's case for instance, it has been estimated that a one percent increase in the ratio of public to private capital stocks improves private factor productivity by around 0.4 percent.[5]

However, there are numerous reasons for thinking that an expansionary fiscal response in the form of increased public spending on traditional public works would be misplaced. First, to suggest that considerable scope exists for increasing public infrastructure spending to earlier levels ignores the fact that since the 1990s relatively lower public capital spending has been more than offset by relatively higher private capital expenditure in the economy. This is consistent with the increased involvement of the private sector in the provision of infrastructure services in the electricity, transport and ICT sectors.

Second, empirical studies may show a relationship between public infrastructure expansion and productivity, private investment and growth, but it can be argued that causality actually runs the other way, from higher productivity, private investment and growth to public infrastructure expansion. Statistically, this unresolved question of the direction of causality arises because evidence of correlation does not imply causation.

When productivity, output and income are high, there is likely to be greater demand for infrastructure.[6] For instance, mineral resource discoveries will induce more private investment in the physical means of extraction, but in turn this leads to greater demand for expansion of transport infrastructure such as railways and port facilities. Moreover, with strong economic growth and higher income, tax revenues will increase, other things being equal, which makes public infrastructure investment more affordable. New footpaths and more comfortable public transport, for example, follow higher economic growth, not the other way around.

The suggestion that higher traditional forms of infrastructure are a necessary means to productivity improvement is also inconsistent with the fact that productivity improved very strongly by OECD standards in the 1990s in Australia, despite relative declines in the share of traditional infrastructure spending. However, this is not to suggest that existing long-lived infrastructure will not need to be well main-



Source: Australian Bureau of Statistics, National Accounts, various.

Figure 2: Public and Private Capital Spending (Percentage of GDP)

tained or replaced into the future, for severe deterioration of existing assets must ultimately adversely affect productivity.

Third, public spending on traditional forms of infrastructure relative to GDP should not be as strong as in earlier decades because the industrial structure of the economy has changed markedly. Services now comprise over two-thirds of GDP and agriculture and manufacturing have become relatively less important. Public sector investment as a share of national expenditure has generally declined for exactly the same reason in other advanced economies as well over recent decades.

The need for traditional forms of economic infrastructure is being transformed into rising demand for the new infrastructure of modern communications which has become integral for transactions throughout the entire economy, not only in so-called 'new economy' industries. With the partial privatisation of Telstra and widespread economic reform of the communications industry, private firms have satisfied much of the demand for this new infrastructure.

Characteristically, ICT is a general purpose or 'enabling' technology that acts as a base for other innovations and hence has widespread and long-lasting economic effects, not unlike those generated in the past by the invention of electricity and the internal combustion engine.[7] ICT contributes to economic growth by dramatically reducing the transactions costs associated with processing, storing and delivering information and has undoubtedly boosted Australia's productivity growth, although productivity performance since the early 1990s has also benefited from the more widespread program of microeconomic reform.[8]

Fourth, sound maintenance and improved efficiency of the existing economic infrastructure stock now makes it possible to manage without proportionately large increases in traditional infrastructure capital. Indeed, the ratio of the capital stock to industry gross value added in most economic infrastructure industries has steadily declined since the mid-1980s (see Figure 3).

This reflects persistent rises in the average productivity of the capital stock used in these sectors as a result of major economic reforms such as corporatisation, privatisation and competition policy discussed above. On the other

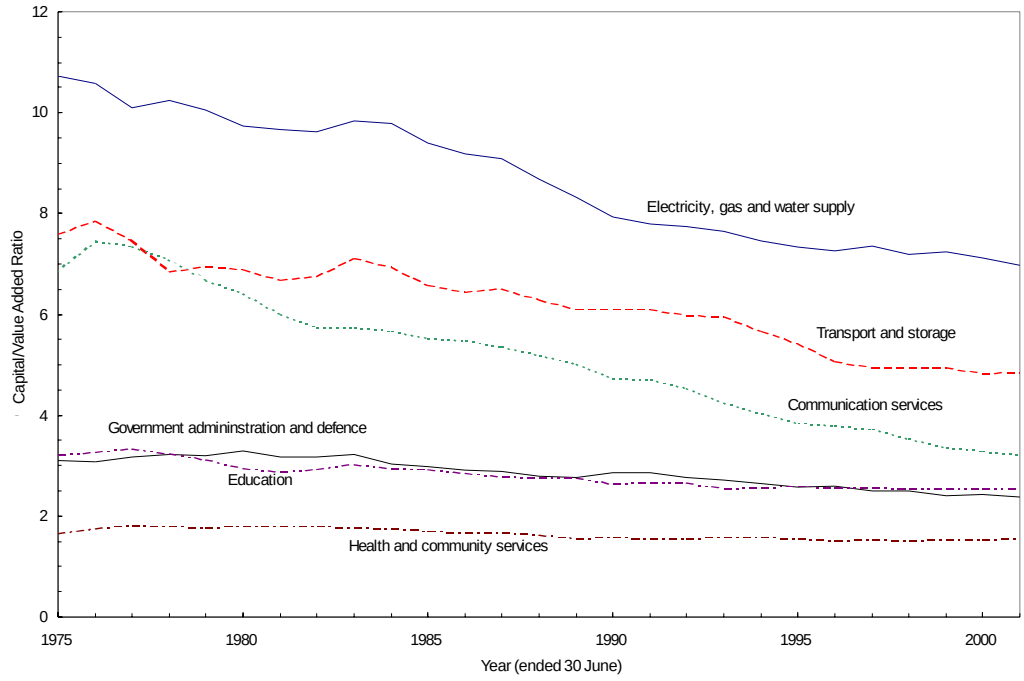


Figure 3: Capital Stock to Gross Production by Infrastructure Sector

hand, no such changes are evident for social infrastructure industries, perhaps reflective of problems in actually measuring the value of production in these industries.

Last, in a small open economy like Australia dependent on foreign capital to fund its current account deficit, the impact of higher infrastructure spending by either the public or private sector could have damaging macroeconomic effects if foreign investors disapprove on the grounds that it was economically unjustifiable.

A rise in infrastructure spending would, other things being equal, raise national expenditure over national production and increase the current account deficit that must be financed. If forward-looking international investors judge that higher infrastructure spending is likely to add to future productive capacity, the current account deficit would be willingly funded. As a result, national production would eventually rise with an enlarged capital stock and the current account deficit would self-correct, without significant exchange rate variation.

On the other hand, if foreign investors perceive that unnecessary, perhaps politically motivated infrastructure spending of the traditional kind was only going to add to future net demand for foreign currency when foreign loans to fund the extra spending mature, there will be pressure on the exchange rate to depreciate ahead of inevitable subsequent depreciation. Following the currency depreciation, nominal domestic wages would eventually be bid up to maintain workers' domestic purchasing power.

Consequently, excess spending on unproductive public works would tend to raise inflationary pressures and interest rates.[9] Importantly, as financial crises in emerging economies in East Asia and Latin America last decade have shown, public and private investment must be productive and be seen to be so by foreign investors, or else adverse macroeconomic consequences flow.

The above reasons for being sceptical about the efficacy of unwarranted old-style public spending on traditional forms of economic infrastructure, as still proposed by many Keynesian-oriented economists, do not necessarily apply, however, to important forms of social infrastructure that are internationally recognised as productivity enhancing. In particular, if judiciously targeted public spending on education and health raises the value of the nation's human capital stock, long-term economic benefits should accrue in terms of higher economic growth and per capita income. In short, external deficits attributable to highly productive infrastructure spending should easily be sustainable.

Summary and Conclusion

There have been three quite distinct policy regimes affecting infrastructure provision and productivity in Australia. Up until the mid-1980s, state ownership of infrastructure industries was predominant, until recognition of the lacklustre performance of public enterprises prompted reform. The corporatisation and partial privatisation phase followed, until the competition policy era emerged from the mid-1990s.

Although the public sector has historically been the main provider of infrastructure, there has been a marked decline in public sector capital spending in Australia in line with trends in other advanced economies. From the mid-1980s microeconomic reform and increased private sector involvement in the provision of infrastructure in Australia lowered the real prices of services to consumers and raised the return on public capital. Despite relative declines in the share of traditional infrastructure spending, Australia's productivity strongly improved in the 1990s to be well above the OECD average, due to economic reform and more intensive use of ICT.

While some studies suggest that higher public expenditure on traditional infrastructure such as ports, roads, airports, electricity provision, water systems, highways, bridges and airports may raise labour productivity and multifactor productivity, causality may actually run from productivity improvement to infrastructure expansion. In an open economy like Australia, unwarranted and unproductive spending on traditional economic infrastructure, whether undertaken by either the private or public sectors, is likely to increase the current account deficit and weaken the exchange rate with inflationary consequences.

On the other hand, to the extent that public spending on education and health effectively raises the productive value the economy's stock of human capital, such spending increases are

likely to be endorsed as justifiable by international investors.

The goal of reducing public debt levels stemming from earlier budget deficits has primarily motivated fiscal policy in Australia since the late 1990s.[10] The rationale has been that high debt public levels can raise foreign debt levels and thereby put upward pressure on domestic interest rates due to country risk and inflation risk factors. A series of budget surpluses has enabled the federal government to reduce its debt to less than 5 percent of GDP which is very low by international standards.[11]

However, this policy neglects the fact that issuing public debt to fund public infrastructure investment is not necessarily unsound if the extra infrastructure yields an economic return at least comparable with the servicing cost of public borrowing undertaken to fund it. Additional public investment may improve output-generating capacity without adverse interest rate and exchange rate effects, provided foreign investors deem the public investment expenditure is productive. Hence, other things being equal, running small budget deficits to finance the diminished share of infrastructure spending now undertaken by the public sector may well be advisable, especially when public debt levels are low.

Notes

* The views expressed in the paper are those of the author and do not necessarily represent those of the IMF or IMF policy. The author is grateful to Anthony Rossiter for every useful research assistance and to anonymous referees for constructive comments.

1. King and Maddock (1996, Chapter 2) elaborates.
2. See Megginson and Netter (2002) for an extensive survey of empirical studies on the effects of privatisation worldwide.
3. See World Bank (1992, 1995).
4. See, for instance, Aschauer (1989, 1995) and Munnel (1992) for the USA.
5. See Otto and Voss (1994).
6. See Munnel (1992) for related discussion.
7. See Gordon (2000) and Lipsey (2001).
8. See Banks (2002) and Parham (2000).
9. Makin (2000, Chapter 7) outlines a formal theoretical model of these linkages.
10. See Commonwealth Treasury (2002).
11. See Makin (2002) for extended discussion.

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