

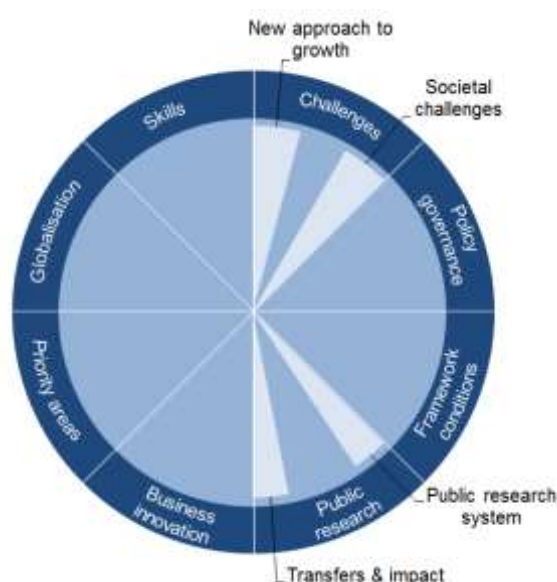
FRANCE

Business investment picked up in France in 2015, and the country's economy started experiencing a modest recovery. However, sluggish growth in productivity and exports is still a challenge. In this context, the government is continuing to promote innovation-led growth through its STI policy.

Table 1. Gross domestic expenditure on R&D (GERD)

	FRA	OECD
GERD		
USD million PPP, 2014	58 750	1 181 495
As a % of total OECD, 2014	5.1	100
GERD intensity and growth		
As a % of GDP, 2014	2.24	2.38
(annual growth rate, 2009-14)	(+0.7)	(+2.3)
GERD publicly financed		
As a % of GDP, 2014	0.81	0.61
(annual growth rate, 2009-14)	(+1.5)	(+2.5)

Figure 1. Major STI policy priorities, 2016



Hot issues

Contributing to structural adjustment and a new approach to growth

Innovation continues to be at the heart of France's policy for growth. The government has reinforced its STI strategies and policies promoting business R&D and the development of young firms. The second phase of the New Industrial France Programme (*Nouvelle France Industrielle*, NFI) was announced in April 2015. It focuses on nine industrial solutions (eco-mobility, data economy, smart objects, medicine of the future, sustainable cities, digital trust, new resources, transport of tomorrow, smart food production). It also includes a cross-cutting initiative (Industry of the Future) for the modernisation and transformation of industrial enterprises. The nine solutions will receive government funds to commercialise new technologies from the Invest in the Future Programme (*Programme d'Investissements d'Avenir*, PIA). The second phase of the NFI aims to concentrate public and private efforts to modernise industrial assets and transform firms' business models in these sectors until 2020. A complementary plan, the New Deal for Innovation (2013), is



promoting the evaluation of public policies (through the C2IT and CNEPI public bodies created in 2014) and an entrepreneurial culture (through Bourse French Tech created in 2014), and improving the framework conditions for technology transfer and the growth of innovative firms.

Addressing social challenges (including inclusiveness)

France aims to improve the contribution of public research to meet societal challenges. This is a key component of the National Strategy for Research published in 2015 (see below). The strategy follows the nine major societal challenges set forth by the France Europe 2020 Agenda (2013): climate change, sustainable energy, industrial renewal, health and well-being, food safety, sustainable mobility, an information and communication society, an innovative society, and freedom and security for Europe. The strategy is linked with the PIA, which allocates USD 14.7 billion PPP (EUR 17.5 billion) for research over 2010-2025.

Strengthening the public research system

The French public research system continues to evolve. Measures have been implemented to strengthen the links between research actors and socio-economic stakeholders. In July 2013, a law on the missions and organisation of the higher education and research system was passed, which encourages PRIs and HEIs to associate or merge so as to reach critical mass in research and teaching. The law propelled the 2015-20 National Research Strategy, which has two objectives: i) **maintaining France's** competitiveness in scientific research on the international stage; and ii) fostering research that answers the scientific, societal, environmental and technological challenges of the 21st century. Each challenge will have a research strategy, a large-scale infrastructure strategy, limited S&T priorities and steering rules.

Improving the transfer of science and its returns and impacts

Public R&D expenditure as a share of GDP is above the OECD median (figure 5^a). Compared to the OECD area, French PRIs file a particularly high amount of patents (figure 5^b). To leverage this favourable position, French policy is continuing to strengthen the commercialisation of public research in the interest of increasing business competitiveness and addressing societal challenges. The National Research Agency (ANR) is providing ongoing support to PRIs' efforts on commercialising research, following the major challenges set out by the France Europe 2020 Agenda. In particular, in 2016 the ANR-funded Carnot Institutes programme (founded in 2006) granted 29 multidisciplinary institutes additional funding that rewarded industrial partnerships. The same year, the ANR introduced a new label "Carnot Springboards", granting nine research centres with funds to strengthen their capacity to develop partnerships with the private sector. Technology transfer companies, the SATT, are being set up as part of the PIA with a specific business plan and professional staff. Joint PRI-SME labs are being supported. Calls for projects within the PIA insist on the need to develop research partnerships and public-private linkages. This is particularly the case with the eight Institutes for Technological Research (*Instituts de recherche technologique*, IRTs), i.e. multidisciplinary public-private innovation campuses set up to strengthen innovation ecosystems within the nation's competitiveness clusters (see below).



Some key STI performance indicators

Figure 2. Economic performance

Labour productivity, GDP per hour worked,
index 2005=100

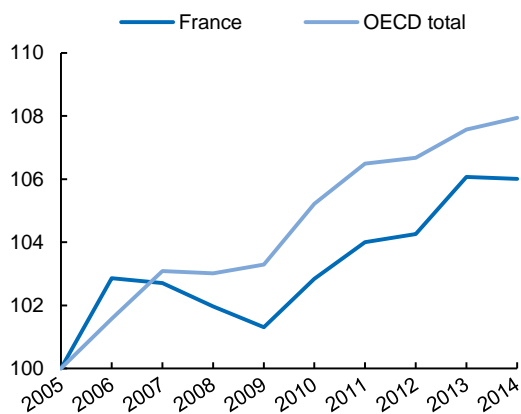


Figure 3. Environmental performance

Green productivity, GDP per unit of CO₂
emitted, index 2005=100

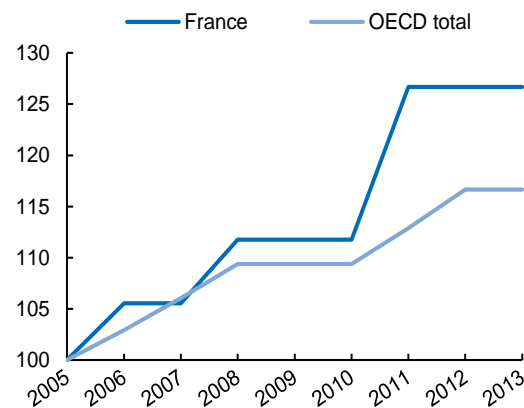
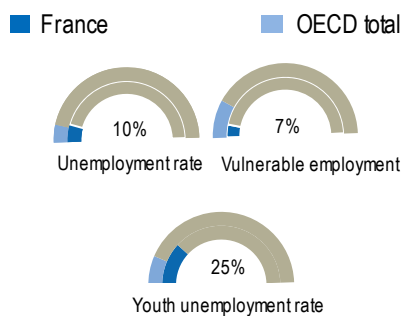


Figure 4. Unemployment

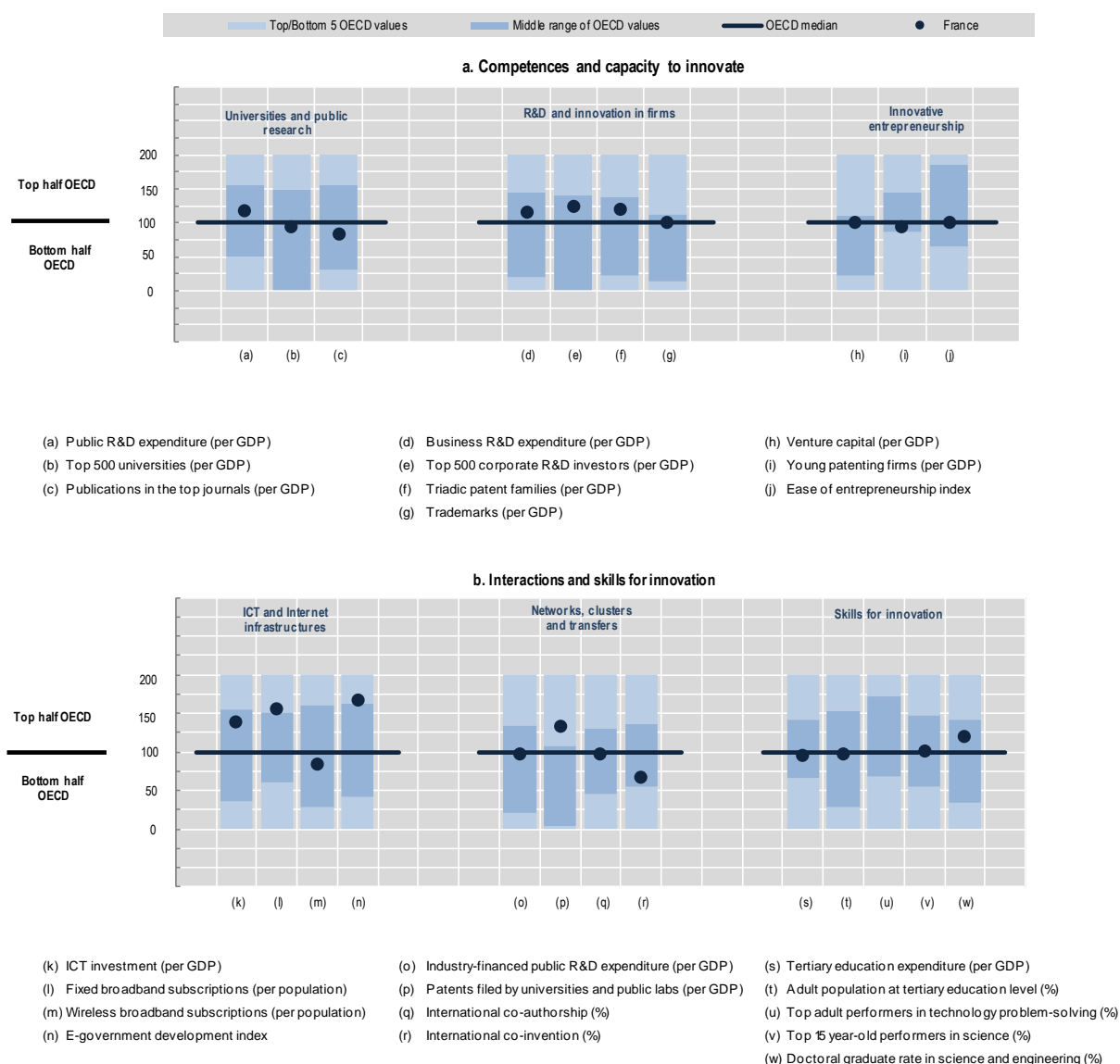
2015 or latest year available



Benchmarking national STI systems

Figure 5. Science and Innovation in France

Comparative performance of national science and innovation systems, 2016



Note: Normalised index of performance relative to the median values in the OECD area (Index median=100).



Highlights of the French STI system

Innovation in firms

France is rather prolific in triadic patent families (figure 5^f). With business R&D at 1.46% of GDP in 2014, France is just above the OECD median (figure 5^d), but below Germany and several countries in northern Europe. To boost R&D and innovation, the government has maintained the R&D tax credit, which is among the most generous in the world, with a total claim of around USD 7 billion PPP (EUR 5.7 billion) in 2013.

Innovative entrepreneurship

France performs averagely in innovative entrepreneurship according to several indicators (figure 5^{h,i,j}). A number of instruments aim at improving the conditions for the creation and growth of start-ups. Bpifrance, the country's public investment bank, provides financial support for start-ups (including seed capital loans) and renewed support for the venture capital sector with funds of funds (national seed capital fund, *multicap croissance*). Bpifrance also provides direct investment funds for ICT firms (*Ambition numérique*) and biotechnology-intensive firms (*Innobio*). In particular, the French Tech initiative aims to accelerate start-up growth through accelerator programmes (*French Tech Accélération* and *Pass French Tech*) and innovation grants (*Bourse French Tech*, operated by Bpifrance). In 2011, a fund of funds (FNA), with USD 711 million PPP (EUR 600 million) was established for seed capital. It has invested notably in digital technologies, life sciences and clean technology. Since 2013, SMEs are also eligible to benefit from R&D tax credits (see above). In addition to the existing tax measures, a new incentive was established in 2016 to encourage corporate groups to invest in start-ups, amounting to USD 320 million PPP (EUR 400 million).

Clusters and smart specialisation

Since 2004, France's competitiveness clusters (*pôles de compétitivité*) have funded public entities' R&D projects on specific themes (e.g. nanotechnology and aerospace). Following an evaluation in 2012, the third phase of this policy (2013-18) is placing more emphasis on the downstream stage (i.e. prototyping and commercialisation of innovations) and on the internationalisation of the clusters. During 2014-15, all French regions implemented their own smart specialisation strategy, based on local and specific strengths and weaknesses.

Globalisation

Increasing the exposure of French researchers and firms abroad remains a key policy goal. Following the 2013 higher education law, the International Transversal Group for Dialogue (GCTI) was redefined in 2015 with the mission of steering the international research and innovation strategy. Over 2013-14, about 13 800 students were part of the International Mobility Support programme, which supports study in foreign countries. The "chairs of excellence" continue to allocate up to USD 2.4 million PPP (EUR 2 million) to selected foreign researchers for a period of 18-48 months in France. Bpifrance has intensified efforts for the internationalisation of French firms by broadening access to export credit since 2013; by end 2016, this institution will also start managing government export guarantees, seeking to simplify and expand companies' access to export financing. Moreover, in January 2015 several export-promotion funds were merged to create Business France, an agency aiming to assist SMEs to better project themselves internationally and attract more investors to France. The French Tech initiative also aims to promote the internationalisation of SMEs through funds from the NFI's second phase, by fostering entrepreneurial hubs across cities worldwide and through a seed accelerator programme that encourages foreign entrepreneurs to establish themselves in France. The Market Research Insurance scheme, covering export firms against the risk of commercial failure, was extended in 2016 to cover short-term activities (less than two years).



Skills for innovation

The Law of July 2013 expands the autonomy of HEIs, giving them greater freedom to design their curricula. While the proportion of adults in tertiary education is at the OECD median (figure 5'), France has a relatively high rate of doctoral students in S&E (figure 5"). Doctoral students have a new statute (the "doctoral contract"), which includes a higher salary and the possibility of teaching, consulting, etc. Student entrepreneurship is also being encouraged through dedicated courses, counselling by experienced entrepreneurs and facilitated access to funding.

Structural aspects and specialisation

Figure 6. Structural composition of BERD, 2013 or latest year available

As a % of total BERD or sub-parts of BERD

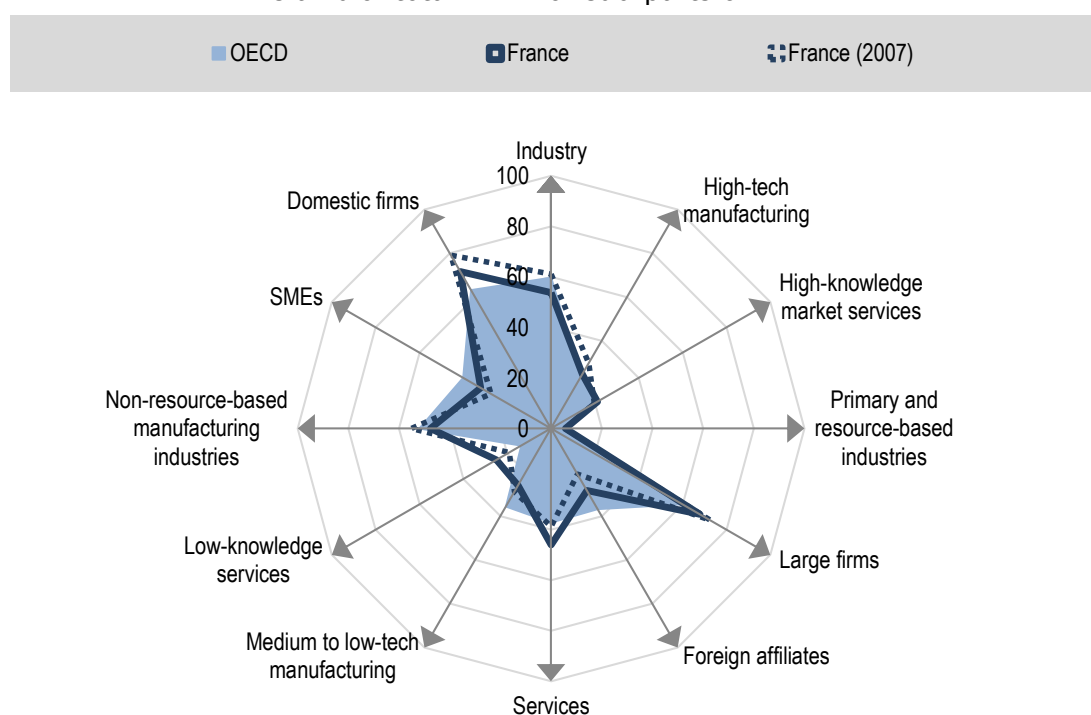
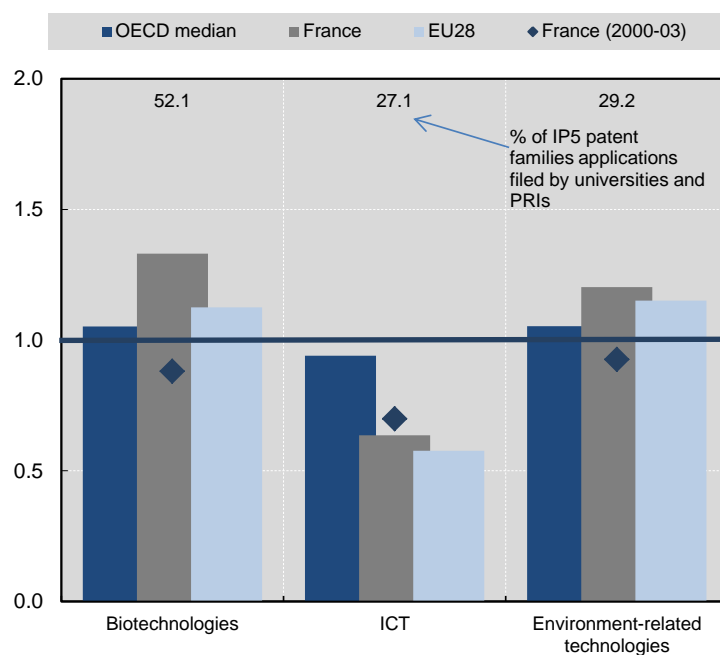
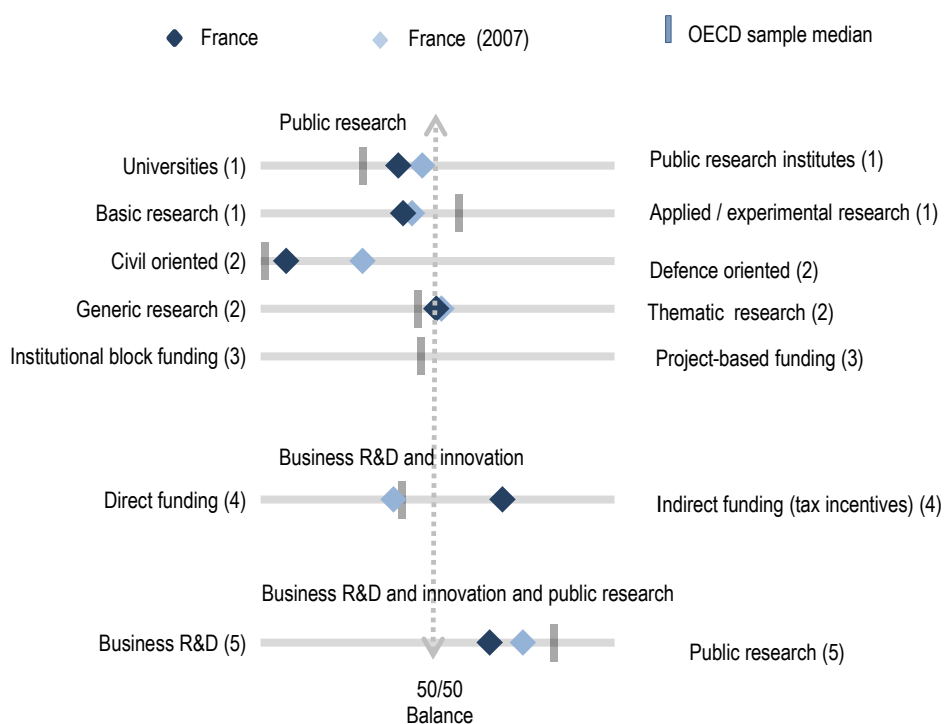


Figure 7. Revealed technology advantage in selected fields, 2011-13
Index based on IP5 patent families applications



National STI policy mix

Figure 8. Allocation of public funds to R&D, 2014 or latest year available
By sector, type of R&D and mode of funding



(1). Balance as a share of both higher education (HERD) and government (GOVERD) R&D expenditure.

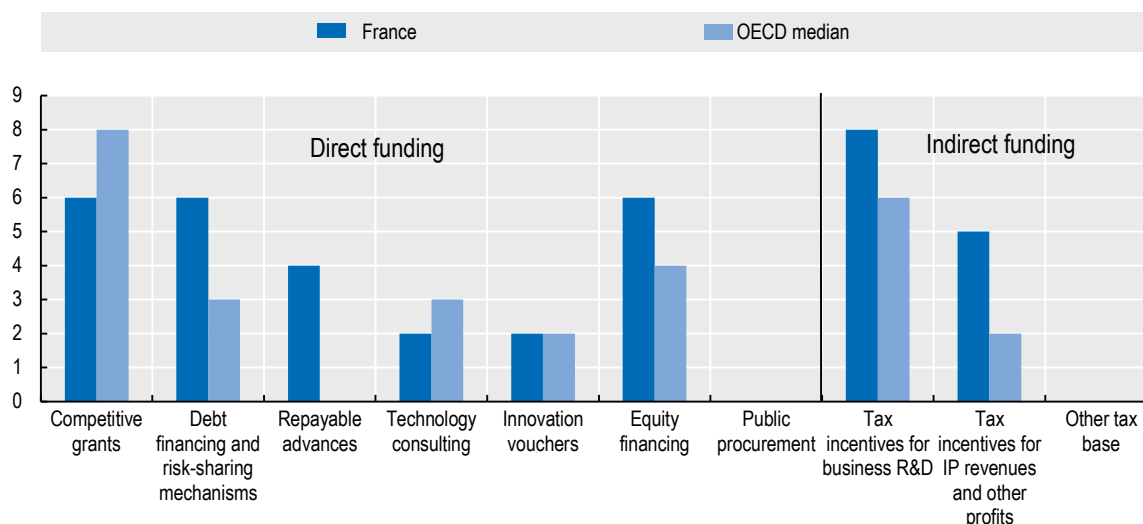
(2). Balance as a share of total government budget appropriations and outlays for R&D (GBAORD).

(3). Balance as a share of total funding to national performers.

(4). Balance as a share of both indirect funding (through R&D tax incentives) and direct funding (through grants, procurement, loans, etc.).

(5). Balance as a share of publicly-funded HERD and GOVERD and components of (4).

Figure 9. Most relevant policy instruments of funding for business R&D, 2016
Country self-assessment, index (9 = high and increasing relevance to 0 = not used)



Note: Policy information comes from country responses to the *OECD STI Outlook* policy questionnaires 2016 and 2014. France's responses are available in the EC/OECD STI Policy Database, edition 2016 at http://qdd.oecd.org/DATA/STIPSurvey/FRA...STIO_2016.

Source: See the reader's guide and methodological annex.

StatLink <http://dx.doi.org/10.1787/888933433806>

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