Council of Australian Postgraduate Associations Incorporated

# Council of Australian Postgraduate Associations (CAPA)

## 2022-23 Pre-Budget Submission

January 2022


Compiled with the assistance of the staff and office bearers
of the Council of Australian Postgraduate Associations (CAPA)
and its affiliated member organisations.

Prepared by Errol Phuah (National President)
Level 1, 120 Clarendon Street, Southbank, VIC, 3006
0430 076 993
**www.capa.edu.au**

# Foreword

The Council of Australian Postgraduate Associations (CAPA) is the peak body representing the interests of the over 400,000 postgraduate students in Australia. We represent coursework and Research, as well as domestic and international postgraduates. We are comprised of 28 university and campus-based postgraduate associations, as well as the National Aboriginal and Torres Strait Islander Postgraduate Association (NATSIPA).

CAPA carries out its mission through policy, research, and activism, communicating the interests and issues of postgraduate students to higher education stakeholders and Federal and State/Territory governments, Opposition parties, and minor parties. We welcome the opportunity to contribute our perspective on the government's upcoming 2022/23 Budget.

## Overview

Investments in research and the higher education sector have been declining over several years, and the consequences will be irreparable if left unaddressed. Furthermore, we are concerned Australia's future innovators will be ill-prepared to contribute competitively in the post-covid environment.

We anticipate innovators of the future will be current and prospective postgraduate students. Thus, for the purpose of this submission, we identified the critical areas of a crisis affecting this demographic and concluded with the following recommendations:

1. Increase government investment expenditure into R&D by a sum of 4 billion AUD annually to match the commitment of other nations.
    a. The additional funds should be divided between the ARC, NHMRC, CSIRO and CRC.
    b. National priorities and industry-driven research should be channelled through the CSIRO and CRC initiatives.
    c. Fundamental ('Blue Sky') research should be funded at the recommendation of the ARC and not fall under the scrutiny of industry representatives.
2. Income support payments must be extended to all full-time domestic postgraduate students
3. The minimum stipend rate of the Research Training Program (RTP) must increase by $150-$250 per week to remain consistent with historical precedence.
4. Extend the Medicare subsidised 20 psychologist session cap into 2023.
5. The government investigate options for price regulation of postgraduate coursework degrees.

## Increasing research funding

Throughout human history, innovation has played a significant role in the rise and fall of many empires and civilisations (Gold, 2021; David, 2008). Even with globalisation and free trade, this remains true, and Australia must commit to continuous innovation to stay competitive on the global stage. This should be how we protect Australia's sovereignty and independence; to pursue the interests of our communities and for the public good. CAPA is concerned this has not been the priority for many years and is reflective in our nation's declining GERD over the years.

The latest figures released by the Australian Bureau of Statistics indicate the gross expenditure on Research and Development (GERD) is 1.79 per cent of GDP (ABS, 2021). This is below the average GERD (2.48 per cent) of Organisation for Economic Co-operation and Development (OECD) countries and has continued to decline since 2008 (OECD, 2021). Our research indicates future policies must include increasing funding to the public sector and more effective incentives for the private sector to invest in R&D.

Australia's declining GERD is the consequence of contracting investments from both the public and private sectors. Consecutive years of budget cuts to public research by the Federal government has shown a steady decline in government expenditure on R&D as a percentage of GDP (GovERD) from .42 per cent in 1992 to .17 per cent in 2018 (ABS, 2020b). Similarly, the business expenditure on R&D (BERD) has declined since 2008 from 2.25 per cent to 1.79 per cent in 2018 - see Figure 1 (ABS, 2021). Both of these issues will need to be addressed and discussed separately.

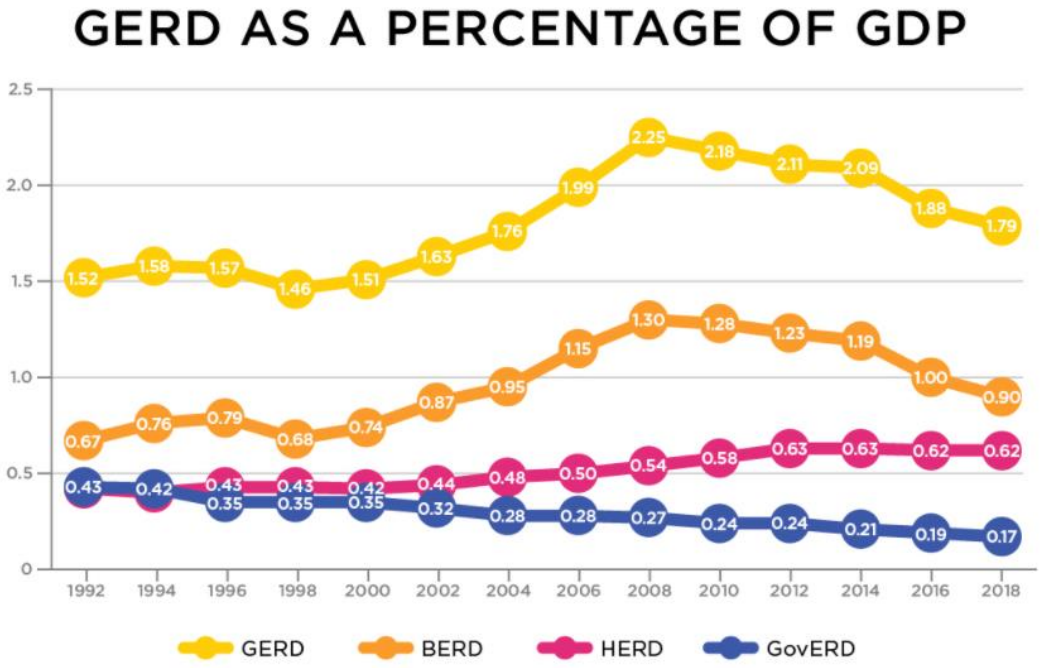


*Figure 1 Australia's GERD as a percentage of GDP 1992-2018. GERD – Gross expenditure on Research & Development has declined since its peak in 2008. BERD – Business expenditure on Research & Development reflects the same declining trends as the overall GERD. HERD – Higher Education expenditure on Research & Development reflects the expenditure by universities on Research has steadily increased over time. GovERD – Government expenditure on Research & Development refers to government spending on Research through ARC, NHMRC, CSIRO and any other research bodies under the government. From Australian Academic of Science. How is science funded in Australia, 2021.*

**GERD funding source compared to other nations**

Our research looked at other OECD nations of similar GDP per capita and included countries with notably higher GERD. Our comparisons found Australia was an outlier in some areas worth discussing – See Table 1 for details.

Summarise our findings:

1. Australia's GovERD is less than half of every other nation at **9.75 per cent** of GERD (exception: United Kingdom.)
2. Australia is the only nation to list education as one of its main exports (funds more than **34 per cent** of Australia's R&D – seen as HERD in Table 1).
3. Australia does not have at least one major manufacturing industry identified as a top 10 export.

*Table 1 Summary table comparing various nations of similar GDP per capita, a breakdown of their GERD and their main exports.*

| Country | GDP per capita (IMF, 2021) | R&D expenditure per % GDP (OECD, 2021) | % GovERD | % BERD | % HERD | Top exports (Workman, 2021) |
|---|---|---|---|---|---|---|
| **United States (Congressional Research Service (2021)** | $ 69,375.38 | 3.067% | 21.2% | 70.9% | >7.9% | Processed oil, Crude Oil, Cars |
| **Denmark (DST, 2021)** | $ 67,919.59 | 2.912% | 38% | 62% | | Pharmaceuticals, Machinery, Electric Machinery |
| **Australia* (ABS, 2020a; ABS 2020b; ABS, 2021)** | **$ 62,618.59** | **1.79%** | **9.5%** | **50%** | **34%** | **Iron Ore, Coal/Natural Gas (energy), Education** |
| **Sweden (Statistics Sweden, 2020)** | $ 58,639.19 | 3.388% | 23.7% | 72% | 4.5% | Machinery Vehicles, Electric Machinery |
| **Finland (OFS, 2019)** | $ 53,522.57 | 2.795% | 30% | 66% | 1% | Machinery, Paper, Electrical Machinery |
| **Austria (Federal Ministry Republic of Austria Education,** | $ 53,793.37 | 3.218% | 28.4 | 54.7% | | Machinery, Electric Machinery, Vehicles |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Science and Research (2021)** | | | | | | |
| **Canada (Statistics Canada, 2021)** | $ 52,791.23 | 1.698% | 24% | 42% | 20% | Mineral fuels, Vehicles, Machinery |
| **Germany (Federal Ministry of Education and Research, 2021)** | $ 50,787.86 | 3.19% | 27.8% | 64.4% | | Machinery, Vehicles, Electric Machinery |
| **United Kingdom (House of Common Library, 2021)** | $ 46,200.26 | 1.796% | 7% | 68% | 24% | Machinery, Gems & Precious metals, Vehicles |
| **South Korea (Yun-hwan, 2020)** | $ 35,195.52 | 4.64% | 21.4% | 76.9% | | Electric Machinery, Machinery, Vehicles |
| **OECD Avg. (OECD, 2021)** | | 2.48% | | | | N/A |

Australia has noticeably lower BERD and GovERD than most other countries but the highest HERD. ABC's Four Corners program covered this issue found that:

> *"...some universities have been admitting international students who are below the university's own published English standards, or who are granted entry through other means without taking an independent English test".*
>
> - **ABC Four Corners 2019**

And

> *"In their visa application they don't have to provide financial capacity documents or English capability test results."*
>
> - **Andrew Durston (former employee in the Department of Immigration), 2019**

(Worthington *et al.,* 2019).

Australia is clearly overleveraged on international student fees for R&D funding by 20-30 per cent even to the closest rivalling international education nations like Canada or the U.K. This is not a comparison Australia should proudly rank highly, especially when achieved with the assistance of these dubious practices. It illustrates the pittance of funding provided by the

private and public sectors for R&D and the counterbalance, the reactionary response of lowering standards to sustain income from international student fees. We stress the need for government intervention by regulating postgraduate student fees (discussed later) and adequately funding research in-line with other nations.

**An example of GERD management by a foreign nation: United States**

Other governments often increase public spending on R&D in response to economic downturns, and we reference the U.S. government's response to the Global Financial Crisis (2007-08). Through the *American Recovery and Reinvestment Act*, the U.S. government increased public funding by 8 per cent, from 124 billion USD to USD 134 billion in 2010 (CRS, 2021). This remains consistent practice for the past 50 years for public spending to increase and compensate for the shortfall in BERD – see Figure 2.

This is crucial in retaining talent and continuing innovating within the U.S., where talented individuals have high mobility to relocate overseas for better career opportunities. We recommend the Federal government adopts a similar practice towards supporting research funding in Australia.

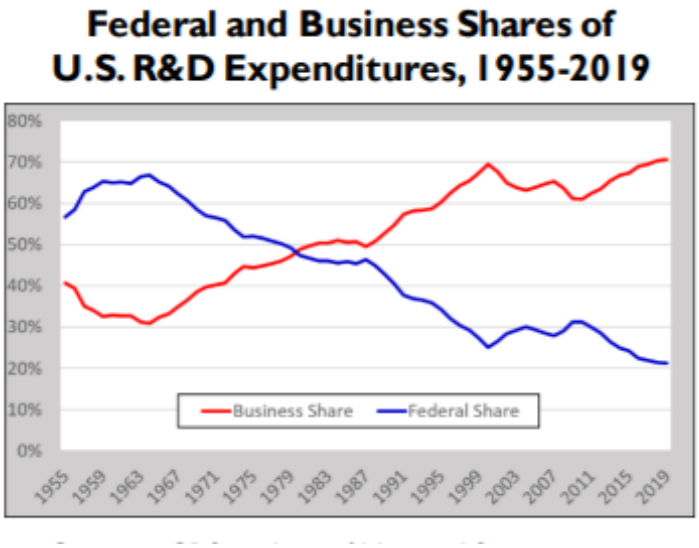


*Figure 2 A comparison of Business share (BERD) and Federal share (GovERD) in the United States during 1955-2019. The annual change of BERD and GovERD complement each other, ensuring Research is consistently funded. Note: this does not include additional funding sources, i.e. philanthropic and HERD. From Congressional Research Service. U.S. Research and Development Funding and Performance: Fact Sheet, 2021.*

<u>Other overlooked statistical trends</u>

Australian Research is often criticised for its myopic focus on academic performance over industry collaboration and translation. These rankings vary between 28$^{th}$ and 33$^{rd}$ in the world for university-industry collaboration. For example, the OECD Science, Technology and Industry scoreboard ranks Australia last of 28 OECD countries for university-industry collaboration (OECD, 2021 Appendix B). A deeper analysis of the raw data found a correlation between these countries' ranking and geographical region.

We found that:

1. Countries ranked highly for university-industry collaborations were either part of the European Union or within the European region.
2. Countries within the Americas and Asia-Pacific region typically ranked lower in the list except for Japan (ranked 13)

When we categorise countries by geographical regions, we see the Americas (south) and Asia-pacific clusters perform more poorly in the rankings than those in Europe. We note the OECD data excluded Canada and the U.S.; however, their inclusion with older data using previous scoreboards still illustrates this regional clustering.

At this time, we cannot validate the correlation between geographical regions and collaboration. Still, it could be attributed to a combination of factors, including cultural, geopolitical, population density, market maturity or government policies. Regardless, it is an unfair contention to conclude Australia's poor performance between universities and industry when it is seemingly an endemic issue for many countries outside of the European sphere.

Our comparative research estimates that Australia's GovERD is approximately half of any other country per cent of GDP. Taking into consideration of the slumping investments from BERD. CAPA recommends that the public research budget should double by a sum of AUD 4 billion to meet the investment standards of other nations.

We recommend that this investment occur transparently and equally amongst existing public entities: in particular, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Australian Research Council (ARC), the National Health and Medical Research Council (NHMRC), and universities via Research Block Grants.

**Funding allocation between institutes**

CAPA is concerned with the recent incident involving a request made to the Australian Research Council (ARC) by the acting Education Minister's to include industry experts in the grant selection process. We believe that the distribution of ARC and National Health and Medical Research Council (NHMRC) funding should be the responsibility of respected public entities only. It is not a matter of expertise but instead on the principle that public funding should be determined by individuals with no competing private interests. This way, Research in Australia can continue to uphold the research community's values and not undermine or compete with the Cooperative Research Centre (CRC) program.

Australia's Research could be modelled similarly to Germany's Fraunhofer Society, which focuses on different fields of applied science. Australia should engage our pre-existing organisations like the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the CRC. National priorities and industry collaboration can be nurtured through these organisations and draw upon the expertise with university collaborations. CSIRO has a rich history and a proven track record for inventions, including Aerogard, Wi-Fi, and polymer banknotes. The return of research funding would revitalise industry collaborations and research commercialisation (Commonwealth Scientific and Industrial Research Organisation, 2021).

**Funding fundamental research**

CAPA believes the emphasis toward research commercialisation should not come at the expense of fundamental Research or 'blue sky' Research. Setting expectations to commercialise products or services from research projects is unrealistic, as the outcome of any study is often unpredictable. The findings often appear to have no immediate utility or value, but we would argue that it is simply the case that an application has not been realised yet. An example of this is Einstein's theory of General Relativity did not find an immediate utility but years later applied in everyday use with GPS (National Aeronautic and Space Administration, 2020).

To further illustrate the importance of fundamental research, we look at the recent example of long covid. Some researchers have speculated the pathology of long covid could be similar to the onset of cold sores, and we understand this is caused by the herpes virus integrating into our DNA (Maldonado *et al*, 2021). However, our fundamental understanding of DNA integration of viruses cannot explain the pathology of long covid (Genetic Engineering & Biotechnology News, 2021). As quoted by Assistant Professor Ellen Foxman of Yale University, we stress the importance of fundamental research in the long term.

> *"Exploratory basic research is very important over the long term, it helps us develop a better understanding of how our bodies and viruses work."*
>
> - ***Assistant Professor Ellen Foxman, Yale School of Medicine.***

Consider many years ago, if a [research] grant application was submitted to explore this kind of knowledge, it would have no obvious application. Today, that same research could have accelerated our understanding of long covid and how it could affect our population. It would have provided valuable insight to the government to assess the risks of lifting restrictions and foresight to any long-term strain on our healthcare system in the coming decades.

We contextualise the level of commitment towards fundamental research of other nations, again using the U.S. as an example. In a recent Congress Review, it was reported that over 33 per cent of basic (fundamental) Research in the U.S. was funded through the U.S. government – see Figure 3 (Congress Research Service, 2021)

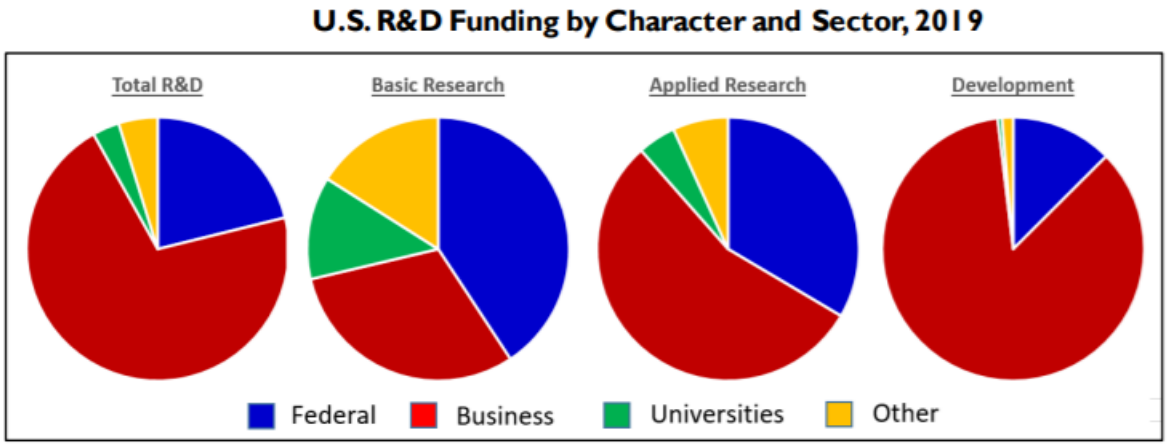


*Figure 3 Breakdown of funding allocation towards basic, applied and development research in the U.S. 201. From the Congressional Research Service, U.S. Research and Development Funding and Performance: Fact Sheet, 2021.*

Likewise, CAPA believes the Federal Government should ensure funding is always available for fundamental research. Ministers should remain open-minded that the application to some research outcomes will not be immediately apparent. However, history has shown it is still valuable.

**Unaddressed challenges in the private sector**

According to the 2021 Global Innovation Index (GII), Australia ranks 25$^{th}$ overall for innovation – see appendix for complete overview (WIPO, 2021). The innovation performance is broken down into 7 pillars, and Australia scored the most poorly under the 'Knowledge and technology outputs' pillar - see Appendix A. More specifically, the poor scoring can be attributed to poor patent usage as referenced as points 6.1.1, 6.1.2 and 6.3.1 in Table 2 below. However, this scoring system's comparison to Purchasing Power Parity (PPP) GDP is likely skewed. It does not consider that the large proportion of Australia's GDP comes from mining instead of patients and exporting complex goods. The scoring is insightful to identify Australia's underperformance in advanced manufacturing, which is often overshadowed by our successes with mining exports.

*Table 2 Australia's scoring breakdown in knowledge and technology outputs. The table ranks Australia's performance to 130 other nations, denoting Australia performs above or below countries of similar economic wealth. From the Global Innovation Index 2021.*

| | | Score/ Value | Rank | |
|---|---|---|---|---|
| | **Knowledge and technology outputs** | **29.1** | **42** | ◇ |
| **6.1** | **Knowledge creation** | **42.9** | **20** | |
| 6.1.1 | Patents by origin/bn PPP$ GDP | 2.0 | 38 | ◇ |
| 6.1.2 | PCT patents by origin/bn PPP$ GDP | 1.3 | 25 | ◇ |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | 0.7 | 28 | |
| 6.1.4 | Scientific and technical articles/bn PPP$ GDP | 52.2 | 6 | ● |
| 6.1.5 | Citable documents H-index | 66.6 | 9 | ● |
| **6.2** | **Knowledge impact** | **31.6** | **59** | ◇ |
| 6.2.1 | Labor productivity growth, % | –1.2 | 87 | ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 14.5 | 9 | |
| 6.2.3 | Software spending, % GDP | 0.2 | 61 | |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 5.7 | 49 | |
| 6.2.5 | High-tech manufacturing, % | 24.6 | 50 | ◇ |
| **6.3** | **Knowledge diffusion** | **12.8** | **78** | ○ ◇ |
| 6.3.1 | Intellectual property receipts, % total trade | 0.3 | 29 | ◇ |
| 6.3.2 | Production and export complexity | 31.6 | 86 | ○ ◇ |
| 6.3.3 | High-tech exports, % total trade | 2.0 | 58 | ◇ |
| 6.3.4 | ICT services exports, % total trade | 1.1 | 78 | ○ |

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness;

The most notable concern is the 'labour productivity growth', where Australia is ranked 87th. (WIPO, 2021). In a StollzNow research survey, it was found that only 34 per cent of Australian businesses believe innovation is core to their business, and only 48 per cent agree "innovation needs to be applied to developing products and services and internal processes (Ricoh, 2020). The main challenges raised were willingness for staff to change and budgets constraints.

We have looked into these studies warning Australia's apathetic and risk-averse attitude towards change and innovation. It is a narrative rarely acknowledged as a significant barrier to research commercialisation. Simply consider, if 64 per cent of the private sector does not embrace innovation within their own corporate culture, it takes little creativity to realise the deficiencies in collaboration between universities and industry. These reports suggest more than half of the private sector is struggling to find capital for innovation, and with falling labour productivity, less competitive and low complexity export goods (WIPO, 2021; Ricoh, 2020). Thus, we do not see the recent policy direction towards research translation will deliver the desired outcome; instead, we believe these are the consequences of the poor investment in human capital.

## Investing in human capital

CAPA is concerned that the current research environment in Australia lacks the career opportunities to retain talent within the country. We stress that the expertise within our research community is highly desirable overseas, allowing for greater mobility to explore more attractive opportunities overseas.

We mentioned the challenges of innovating within industry in a previous section, and it needs to be re-addressed here to emphasise investment into human capital, including quality education. The university experience is a time for personal development, to develop 'outside the box thinking' that will translate to innovation and increasing labour productivity of

graduates. These benefits have been overlooked, and these deficiencies are bleeding into effect, as seen through Australia's ability to translate innovation into manufacturing complex exports and the deteriorating labour productivity mentioned previously.

Over the years, the education sector has been channelling efforts towards meeting output demands than developing the workforce, which will continue to hinder the acceptance of innovation in the future. An aspiration for graduates to be trained with the relevant skills for employment to be 'job-ready' only addresses replenishing a workforce that will continue 'businesses as usual' and not one that embraces an innovative culture needed to promote competition. Instead, we should focus degrees on quality education to produce graduates who will take the initiative and help transform an organisation with new and innovative ideas.

Our recommendation is to consider structural reform of the higher education sector to focus on quality education and develop innovative graduates. We believe these would be the first steps to regaining public confidence for additional funding and refocusing on rebuilding a workforce that embraces innovation to its fullest.

## Extend income support to research and coursework domestic postgraduate students

CAPA continues to advocate the need to extend the eligibility criteria for income support for postgraduate students without income. As it currently stands, income support is only eligible to those enrolled in courses listed explicitly as the minimum, fastest, or only pathway to gain an entry-level qualification for their profession (Australian Government, Department of Social Services, 2018). The interpretation of these criteria allows for only 28 per cent of courses at public universities to meet this description (Council of Australian Postgraduate Associations, 2018). To that end, most domestic postgraduate students miss out on income support and must be addressed.

The 2008 Bradley Review of Australian Higher Education recommends extending income support to postgraduate students, and we echo this recommendation. Completing a postgraduate degree is a distinguished achievement signifying personal development that can translate to climbing the socio-economic ladder. Education rigorously challenges an individual to develop and grow; the barriers to its attainment should never be financial. So it is imperative to enable students from low socio-economic backgrounds to complete their postgraduate studies (Bradley, Noonan, Nugent, & Scales, 2008).

### Other implications

We are concerned that the inability to distinguish the needs of postgraduate students from the main population has far more significant implications beyond income support. The rollout of support often follows healthcare cards, concession cards, Austudy, and youth allowance recipients, to which most postgraduate students are not. In 2020, many postgraduate students experienced the loss of income during the lockdowns and were ineligible to receive JobSeeker payments. If not for income support, there is a desperate need for the Department of Social

Services to classify postgraduate students, especially research students, into an appropriate category, so they do not fall between the cracks.

### Income support for Research Students

Research students are not eligible for any Centrelink study payments on the merit of their enrolment despite their contribution to Research. In a submission response to the COVID inquiry in 2020, we presented our concerns that ~40 per cent of research students are not offered a stipend scholarship to assist with living costs and the working conditions of research students (Council of Australian Postgraduate Associations, 2018). Furthermore, we advocate increasing the RTP stipend rates based on our comparisons with historical precedence.

We based our argument on the connection between the similarity of work research students and research assistants:

> *"Research Assistants support social scientists conduct laboratory, survey, and other research. They may help prepare findings for publication and assist in laboratory analysis, quality control, or data management. Research Assistants are not independent and report to a supervisor or principal investigator."*
>
> ***– National Skills Commission, 2021.***

Historically, the HDR stipend amount was determined relative to a research assistant's salary based on the abovementioned rationale. The stipend established in 1959 was 85 per cent of this annual income (Council of Australian Postgraduate Associations, 2004). The National Skills Commission estimates that today's average take-home wage of a research assistant is $1191.02 after-tax; 85 per cent of this salary would be $1012.37 a week. (National Skills Commission, 2021). Under the Commonwealth Scholarships Guidelines (Research) 2017, the current stipend amount falls between $554.88 and $866.85 a week (Department of Education and Skills and Employment, 2021). This pay gap is $150-$250, which is the equivalent of the weekly rental expense for a modest living arrangement and must be addressed.

Financial pressure is one of the key reasons students withdraw from their studies (Universities Australia, 2018). Extending income support to postgraduate students and increasing the stipend threshold amount of the RTP will alleviate the financial burdens put on postgraduate students. This ensures students will have the best chance of completing and reducing wasted resources for students who would discontinue due to financial stresses.

On this basis, we recommend that the government extend income support to all full-time domestic postgraduate students and increase the stipend threshold of RTP to at least 70 per cent of a research assistant's annual salary.

## Extending the COVID mental health support

In 2020, the Federal government quickly amended the mental health treatment plan to allow up to 20 sessions per calendar year until June 2022 (Department of Health, 2020). CAPA commends the government for their response and advocates these policies for supporting mental health be revisited, given the extended duration of this pandemic. We must also consider an increasing number of deaths from the omicron variant, leading to many families grieving over their loss and will require support.

Figures from the Australian Institute of Health and Welfare indicate the number of claims for services under the mental health treatment plan remains above pre-pandemic conditions – see Figure 4 (Australian Institute of Health and Welfare, 2021). We know that the increase in mental health support claims are likely more individual seeking mental health because the service increase is accompanied by the rise in dispensed prescriptions – see Figure 5.

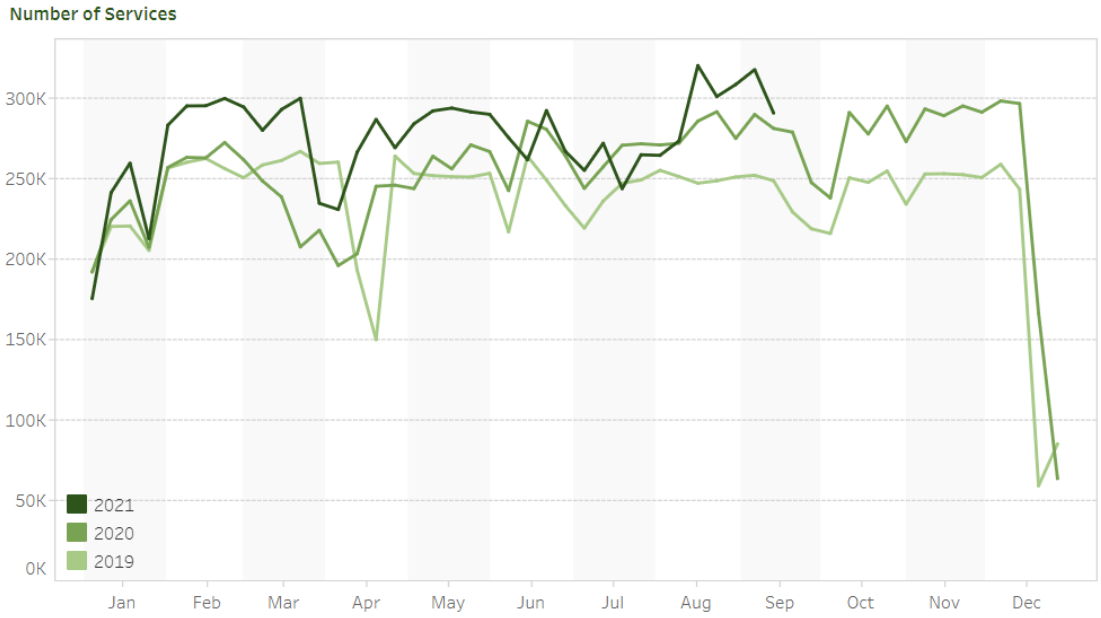


*Figure 4 Comparison of Medical Benefit Scheme numbers processed weekly, January 2019-September 2021. From Australian Institute of Health and Welfare. Mental health service in Australia, 2021*

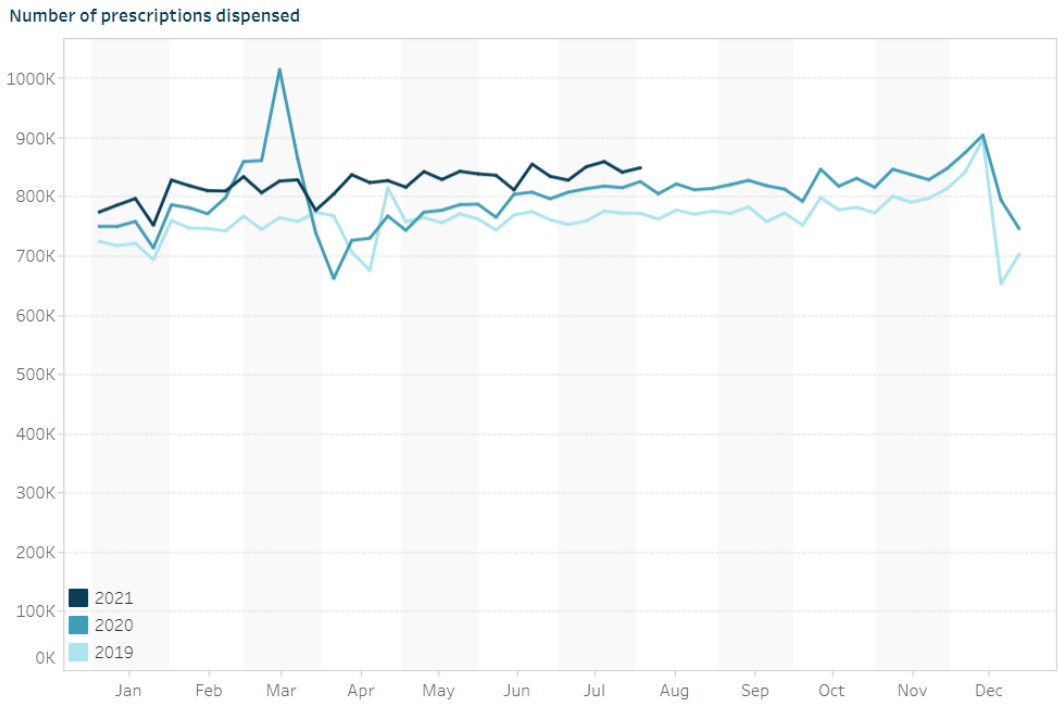


*Figure 5 Number of mental health-related prescriptions dispensed by weekly reporting January 2019 – August 2021. Australian Institute of Health and Welfare, Mental health service in Australia, 2021*

Of particular concern to CAPA is postgraduate students experiencing mental health issues through this pandemic. Mental health was already a concern, particularly among research students before covid. In a pre-covid study, it was found that mental health disorders were more prevalent among graduate research students than in undergraduates (Levecque, Anseel, De Beuckelaer, Heyden, & Gilse, 2017). This could be attributed to the workload and intensity demanded from the work whilst balancing lifestyles, including parents with young children, studying at regional universities and lab-based Research. Many of these lifestyles and the strategies to manage them have been disrupted through this pandemic.

Thus we recommend this limit be maintained at 20 considering the uncertainties with the pandemic still at play and based on the current demand for mental health support.

## Regulation of postgraduate course fees

The deregulation of postgraduate degrees' tuition fees has allowed universities to set expensive fees without transparency on the actual cost of delivering a course. This lack of accountability has led to larger HELP loans burdening both the Federal government and postgraduate students. The sole beneficiary of this arrangement are universities using this arrangement to make up for funding shortfalls as covered in the previous section.

Effectively, the deregulation of postgraduate fees also deregulated the amount government lends to an individual through the HELP program. We recommend exploring the re-introducing price regulation for postgraduate degrees to remedy this. This will benefit students with lower

student loans and free up additional funds for research funding that would otherwise be locked into student loans.

## Conclusion

Our pre-budget submission echos similar concerns raised in previous submissions but now includes more recent statistical figures since the pandemic. We highlighted several challenges that impact postgraduate students financially and have recommended:

- expanding the eligibility criteria for income support to more postgraduate students
- increasing the base stipend value of the RTP scholarship to restore consistency with historical precedence and;
- exploring options to regulate the fees of postgraduate courses.

Our recommendations also include extending the Medical Benefit Scheme and allowing claims for up to 20 psychologist sessions a year in response to the prolonged circumstances of this pandemic.

Finally, we recommend a substantial increase in public research funding and support applied or industry-driven research to be pursued through CSIRO and CRC initiatives. We debunked the data often referenced to justify the lack of research collaboration between universities and industry and proposed an alternate perspective of promoting translational research in Australia.

We thank the Australian government and the Treasury for extending this opportunity to provide input and consultation on our constitutes.

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## Appendices:

**Appendix A:** A breakdown of Australia's scoring in the 2021 Global Innovation Index

# Australia

GII 2021 rank **25**

| Output rank | Input rank | Income | Region | Population (mn) | GDP, PPP$ (bn) | GDP per capita, PPP$ | GII 2020 rank |
|---|---|---|---|---|---|---|---|
| 33 | 15 | High | SEAO | 25.5 | 1,307.9 | 50,845 | 23 |

| | | Score/ Value | Rank |
|---|---|---|---|
| **Institutions** | | **88.3** | **10** |
| **1.1** | **Political environment** | **85.0** | **15** |
| 1.1.1 | Political and operational stability* | 83.9 | 13 |
| 1.1.2 | Government effectiveness* | 85.6 | 14 |
| **1.2** | **Regulatory environment** | **92.3** | **10** |
| 1.2.1 | Regulatory quality* | 92.5 | 4 ● |
| 1.2.2 | Rule of law* | 92.4 | 13 |
| 1.2.3 | Cost of redundancy dismissal | 12.0 | 38 |
| **1.3** | **Business environment** | **87.7** | **11** |
| 1.3.1 | Ease of starting a business* | 96.6 | 7 ● |
| 1.3.2 | Ease of resolving insolvency* | 78.9 | 19 |
| **Human capital and research** | | **57.4** | **12** |
| **2.1** | **Education** | **59.6** | **29** |
| 2.1.1 | Expenditure on education, % GDP | 5.1 | 35 |
| 2.1.2 | Government funding/pupil, secondary, % GDP/cap | 15.4 | 74 ○ ◇ |
| 2.1.3 | School life expectancy, years | 20.5 | 1 ● ◆ |
| 2.1.4 | PISA scales in reading, maths and science | 499.0 | 20 |
| 2.1.5 | Pupil-teacher ratio, secondary | n/a | n/a |
| **2.2** | **Tertiary education** | **54.3** | **6 ● ◆** |
| 2.2.1 | Tertiary enrolment, % gross | 107.8 | 3 ● ◆ |
| 2.2.2 | Graduates in science and engineering, % | 17.4 | 88 ○ ◇ |
| 2.2.3 | Tertiary inbound mobility, % | 26.5 | 4 ● ◆ |
| **2.3** | **Research and development (R&D)** | **58.3** | **17** |
| 2.3.1 | Researchers, FTE/mn pop. | ◴ 4,532.4 | 21 |
| 2.3.2 | Gross expenditure on R&D, % GDP | ◴ 1.8 | 20 |
| 2.3.3 | Global corporate R&D investors, top 3, mn US$ | 65.3 | 18 |
| 2.3.4 | QS university ranking, top 3* | 77.9 | 7 ● |
| **Infrastructure** | | **55.7** | **20** |
| **3.1** | **Information and communication technologies (ICTs)** | **88.3** | **13** |
| 3.1.1 | ICT access* | 80.6 | 29 |
| 3.1.2 | ICT use* | 81.5 | 20 |
| 3.1.3 | Government's online service* | 94.7 | 7 ● |
| 3.1.4 | E-participation* | 96.4 | 9 |
| **3.2** | **General infrastructure** | **42.4** | **22** |
| 3.2.1 | Electricity output, GWh/mn pop. | 10,435.2 | 13 |
| 3.2.2 | Logistics performance* | 79.1 | 18 |
| 3.2.3 | Gross capital formation, % GDP | 22.0 | 66 ○ |
| **3.3** | **Ecological sustainability** | **36.4** | **41** |
| 3.3.1 | GDP/unit of energy use | 9.3 | 77 ○ |
| 3.3.2 | Environmental performance* | 74.9 | 13 |
| 3.3.3 | ISO 14001 environmental certificates/bn PPP$ GDP | 1.9 | 47 |
| **Market sophistication** | | **66.4** | **9 ●** |
| **4.1** | **Credit** | **75.8** | **5 ● ◆** |
| 4.1.1 | Ease of getting credit* | 95.0 | 4 ● ◆ |
| 4.1.2 | Domestic credit to private sector, % GDP | 135.8 | 13 |
| 4.1.3 | Microfinance gross loans, % GDP | n/a | n/a |
| **4.2** | **Investment** | **38.2** | **39** |
| 4.2.1 | Ease of protecting minority investors* | 64.0 | 56 |
| 4.2.2 | Market capitalization, % GDP | 102.7 | 12 |
| 4.2.3 | Venture capital investors, deals/bn PPP$ GDP | 0.1 | 23 |
| 4.2.4 | Venture capital recipients, deals/bn PPP$ GDP | 0.1 | 19 |
| **4.3** | **Trade, diversification, and market scale** | **85.2** | **13** |
| 4.3.1 | Applied tariff rate, weighted avg., % | 0.8 | 8 ● |
| 4.3.2 | Domestic industry diversification | 94.0 | 35 |
| 4.3.3 | Domestic market scale, bn PPP$ | 1,307.9 | 18 |

| | | Score/ Value | Rank |
|---|---|---|---|
| **Business sophistication** | | **43.0** | **26** ◇ |
| **5.1** | **Knowledge workers** | **52.2** | **[24]** |
| 5.1.1 | Knowledge-intensive employment, % | ◴ 46.1 | 17 |
| 5.1.2 | Firms offering formal training, % | n/a | n/a |
| 5.1.3 | GERD performed by business, % GDP | ◴ 0.9 | 22 |
| 5.1.4 | GERD financed by business, % | n/a | n/a |
| 5.1.5 | Females employed w/advanced degrees, % | ◴ 22.6 | 22 |
| **5.2** | **Innovation linkages** | **44.6** | **19** |
| 5.2.1 | University-industry R&D collaboration† | 53.4 | 33 ◇ |
| 5.2.2 | State of cluster development and depth† | 55.3 | 34 |
| 5.2.3 | GERD financed by abroad, % GDP | n/a | n/a |
| 5.2.4 | Joint venture/strategic alliance deals/bn PPP$ GDP | 0.2 | 10 |
| 5.2.5 | Patent families/bn PPP$ GDP | 1.0 | 27 ◇ |
| **5.3** | **Knowledge absorption** | **32.2** | **52** ◇ |
| 5.3.1 | Intellectual property payments, % total trade | 1.1 | 33 |
| 5.3.2 | High-tech imports, % total trade | 10.2 | 30 |
| 5.3.3 | ICT services imports, % total trade | 1.1 | 67 ○ ◇ |
| 5.3.4 | FDI net inflows, % GDP | 3.6 | 37 |
| 5.3.5 | Research talent, % in businesses | ◴ 27.9 | 43 ◇ |
| **Knowledge and technology outputs** | | **29.1** | **42** ◇ |
| **6.1** | **Knowledge creation** | **42.9** | **20** |
| 6.1.1 | Patents by origin/bn PPP$ GDP | 2.0 | 38 ◇ |
| 6.1.2 | PCT patents by origin/bn PPP$ GDP | 1.3 | 25 ◇ |
| 6.1.3 | Utility models by origin/bn PPP$ GDP | 0.7 | 28 |
| 6.1.4 | Scientific and technical articles/bn PPP$ GDP | 52.2 | 6 ● |
| 6.1.5 | Citable documents H-index | 66.6 | 9 ● |
| **6.2** | **Knowledge impact** | **31.6** | **59** ◇ |
| 6.2.1 | Labor productivity growth, % | –1.2 | 87 ○ |
| 6.2.2 | New businesses/th pop. 15–64 | 14.5 | 9 |
| 6.2.3 | Software spending, % GDP | 0.2 | 61 |
| 6.2.4 | ISO 9001 quality certificates/bn PPP$ GDP | 5.7 | 49 |
| 6.2.5 | High-tech manufacturing, % | 24.6 | 50 ◇ |
| **6.3** | **Knowledge diffusion** | **12.8** | **78** ○ ◇ |
| 6.3.1 | Intellectual property receipts, % total trade | 0.3 | 29 ◇ |
| 6.3.2 | Production and export complexity | 31.6 | 86 ○ ◇ |
| 6.3.3 | High-tech exports, % total trade | 2.0 | 58 ◇ |
| 6.3.4 | ICT services exports, % total trade | 1.1 | 78 ○ |
| **Creative outputs** | | **39.6** | **24** |
| **7.1** | **Intangible assets** | **41.7** | **37** |
| 7.1.1 | Trademarks by origin/bn PPP$ GDP | 58.2 | 38 |
| 7.1.2 | Global brand value, top 5,000, % GDP | 77.1 | 26 |
| 7.1.3 | Industrial designs by origin/bn PPP$ GDP | 2.3 | 43 |
| 7.1.4 | ICTs and organizational model creation† | 67.3 | 25 ◇ |
| **7.2** | **Creative goods and services** | **22.4** | **43** ◇ |
| 7.2.1 | Cultural and creative services exports, % total trade | 0.3 | 66 ○ |
| 7.2.2 | National feature films/mn pop. 15–69 | 3.2 | 58 ○ |
| 7.2.3 | Entertainment and media market/th pop. 15–69 | 62.4 | 6 |
| 7.2.4 | Printing and other media, % manufacturing | 2.0 | 15 |
| 7.2.5 | Creative goods exports, % total trade | 0.7 | 57 |
| **7.3** | **Online creativity** | **52.9** | **17** |
| 7.3.1 | Generic top-level domains (TLDs)/th pop. 15–69 | 62.3 | 9 ● |
| 7.3.2 | Country-code TLDs/th pop. 15–69 | 54.6 | 15 |
| 7.3.3 | Wikipedia edits/mn pop. 15–69 | 75.8 | 21 |
| 7.3.4 | Mobile app creation/bn PPP$ GDP | 15.1 | 33 |

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ◴ indicates that the economy's data are older than the base year; see appendices for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.



1.

Source: World Intellectual Property Organisation (WIPO) (2021), Global Innovation Index 2021: Tracking Innovation through the COVID crisis 14th ed, 2021. Retrieved from https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021.pdf

**Appendix B:** Ranking by University-Industry collaboration of OECD countries sorted by geographical regions.

| Country | Ranking by University-Industry collaboration |
|---|---|
| Europe | |
| UK | 1st |
| Belgium | 2nd |
| Austria | 3rd |
| Finland | 4th |
| Slovenia | 5th |
| Estonia | 6th |
| Norway | 7th |
| Spain | 8th |
| Netherlands | 9th |
| Denmark | 10th |
| Germany | 11th |
| Iceland | 12th |
| France | 14th |
| Poland | 15th |
| Hungary | 16th |
| Czech Republic | 17th |
| Slovak Republic | 18th |
| Turkey | 19th |
| Switzerland | 20th |
| Greece | 21st |
| Portugal | 22nd |
| Latvia | 23rd |
| South Americas | |
| Brazil | 25th |
| Chile | 27th |
| Asia - Pacific | |
| Japan | 13th |
| Korea | 24th |
| New Zealand | 26th |
| Australia | 28th |

Source: Organisation for Economic Co-operation and Development (OECD) 2021, OECD Science, Technology and Innovation Scoreboard, 2021. Retrieved from https://www.oecd.org/sti/scoreboard.htm