



**Australian Government**

**IP Australia**

# Report on patent backlogs, inventories and pendency

IP Australia Economic Research Paper 01

Report commissioned by IP Australia and authored by:

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This is an independent report commissioned by IP Australia. Findings and opinions are those of the researchers, not necessarily the views of the IP Australia or the Government.

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# Executive Summary

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This report analyses IP Australia's patent inventory using the framework produced by the United States Patent and Trademark Office and the UK Intellectual Property Office. As such it allows for easy comparison between the countries and transparent data on the current inventory of applications.

The total inventory at IP Australia more than doubled between 2000 and 2009. This growth in inventory peaked at 100,000 pending applications in 2010 and has fallen steadily since then. By the start of 2013, IP Australia had a total inventory of just under 90,000 applications.

The growth in the early 2000s is correlated with the increasing number of applications filed every year but primarily with the low number of examiners on staff between 2003 and 2006. The falling number of applications after the GFC (which have just recovered to pre-GFC levels) and the increase in the number of examiners since 2006 appears to have enabled IP Australia to stabilise the number of applications per examiner and also reduce the overall inventory levels.

IP Australia's current inventory per examiner is 278, and is the lowest since 2001. Even then it is higher, by far, than comparable figures for other offices, where the UK-IPO had 198 applications in the inventory for every examiner, and the USPTO had 169.

Median exit pendency (i.e. the time it took for applications to be granted) for applications filed at IP Australia has increased by about 2 years from 2000 to 2010. Applications granted since 2010 have been granted faster, and from 2010 to 2013 exit pendency had fallen by half a year. Comparing pendency between the UK, US and Australian offices is complicated by the fact that IP Australia operates a deferred examination system, while the US and UK offices operate a different model.

As part of the deferred exam system, IP Australia directs the majority of its applicants to request examination. Applicants who voluntarily request examination without a direction have done so overwhelmingly in the first month after filing. There is a pronounced difference in the acceptance rate of applications where the examination request is voluntarily filed in the first month (38 per cent) and the second month (46 per cent), and this higher rate is maintained for exam requests filed over the next 6 months.

The report concludes that while pendency and inventories both increased quickly until 2009, both have since declined noticeably. It is recommended that IP Australia make better use of its administrative data to set up a prioritisation system for examination, so as to ensure that old applications are processed quickly. There would also be a benefit to utilise this framework in work planning and projections for future inventory size.

# Introduction

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The purpose of this report is to analyse IP Australia’s patent backlog using the backlog framework from the recent joint report by the United States Patent and Trademark Office and the UK Intellectual Property Office.<sup>1</sup> The aim is to quantify the current patent backlog at IP Australia and provide the information in a framework that allows us to compare inventories across countries.

This report uses publicly available data from IP Australia to investigate trends, bottlenecks and processes that relate to patent prosecution.<sup>2</sup> The same data set is used to estimate the size of current inventory of applications using the backlog framework.

The data set used for this report is from January 1995 to May 2013 and is limited to standard patents.<sup>3</sup> Due to various changes in processes and systems the quality of data varies across different years. Data is transformed to a standardized format and may not conform exactly to official numbers.

## 1. Methodology

The backlog framework identifies four fundamental waypoints which all patent applications pass through irrespective of the distinct laws and processes in the country the application was submitted. These are Receipt, Ripe, Decision and Disposal, defined in table 1.<sup>4</sup>

1. Receipt	The date the application is received in the Office. For IP Australia this is either the date of national phase entry or the filing date for applications filed directly.
2. Ripe	When the application is ready for examiner action. This is the date when a request for examination is submitted by the applicant to IP Australia.
3. Decision	When a first decision to grant <i>could</i> have been made. This is the Date when the first substantive examination is complete by IP Australia. This can result in either a first report or acceptance.
4. Disposal	Disposed in terminal action. This is the date when the patent is sealed (i.e. granted) by IP Australia, or if the application is unsuccessful, the date when the early termination is published.

Table 1: Four points through which an application passes

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<sup>1</sup> See Mitra-Kahn, B., Marco, A., et al., 2013, “Patent backlogs, inventories, and pendency: An international framework,” IPO- & USPTO joint report, <http://www.ipa.gov.uk/ipresearch-uspatlog-201306.pdf>

<sup>2</sup> See IP Australia Bulk Data, at <http://www.ipa.gov.au/about-us/corporate/bulk-data-products>

<sup>3</sup> So we do not consider innovation patents, the previous petty patents or provisional applications – unless they are converted to standard applications

<sup>4</sup> See table 2.1, page 20 of the UK-IPO, USPTO joint report for corresponding UK and US points.

Inventories between these four points are labelled as 'stocks' and these stocks provide a useful point of comparison within offices and across countries.

### Defining Stocks

The total patent application inventory is divided into three stocks based on events that are common among examining patent offices. At any point in the process an application can be voluntarily withdrawn, or lapsed, at which point it leaves the inventory.

- Stock 1: Receipt, but not Ripe – an application is received, but is not yet ready for examination. The application will stay in stock 1 until the applicant files an examination request, at which point it will move to stock 2.
- Stock 2: Ripe, but no Decision – the application is complete and ready for examination but no examination has been completed. The application will remain in stock 2 until an examiner gives a first decision, at which point the application progresses to stock 3.
- Stock 3: Decision, but pending Disposal – The application has been examined for the first time, but is still pending final disposal. These applications may be under further examination or going through the opposition process. In IP Australia the application will remain in stock 3 until the opposition period has passed and the applicant has paid the grant fee, at which point the application is granted and leaves the inventory.

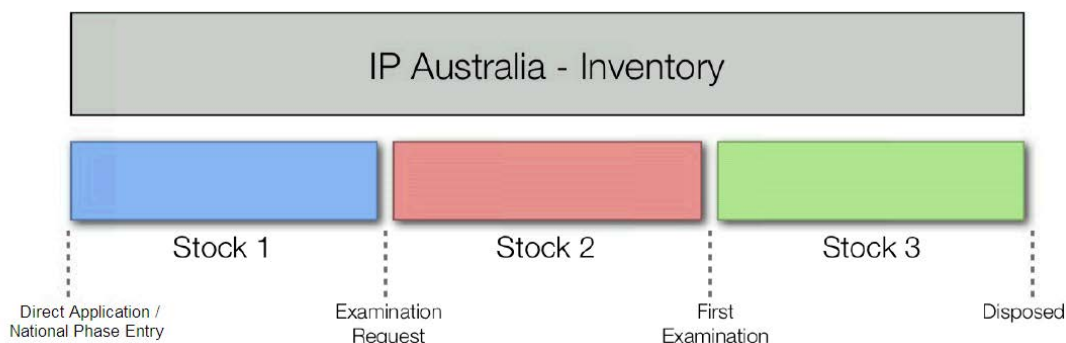


Figure 1 - Inventory and Stocks

During a patent application's life, a series of actions are taken by the applicant and the patent office, and so it is useful to consider whether an application is with the applicant or the office for action. Each stock can therefore be further divided into:

- Inside the office: The number of applications that are pending, awaiting action from IP Australia.
- Outside the office: The number of applications that are pending, awaiting action by the applicant.

By further disaggregating the stocks in this way we would be able to identify the amount of time that applications spend inside and outside the office for the purposes of better targeting interventions or policy steps designed to influence the size of the backlog.



Figure 2 - Inventory - inside and outside

Unfortunately the administrative data in its current form does not include a map of when applications are sent forth and back. Only the last further report date is available for analysis. As this single action is of limited analytical use, this reports first recommendation is for IP Australia to map out the actions that involve inbound and outbound correspondence and include markers in their administrative data to allow analysis of whether applications sit inside or outside the office. This is particularly relevant for an office that allows applicants to 'opt-in' by filing exam requests and other active requests, as pendency will be deadline driven – as pointed out in the Joint USPTO-UK-IPO report.

### Pendency

To estimate and compare pendency of applications within the patent office, the framework defines two observable measures of pendency:

- Exit Pendency: The time to terminal disposal (sealed, lapsed, refused, etc) for all applications terminating in the same month.
- Entry Pendency: The time to terminal disposal for all applications that are filed in the same month.

This report will estimate both types of observable pendency.<sup>5</sup>

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<sup>5</sup> A third, unobservable, measure is also discussed in the joint report, namely 'expected pendency'. This is the pendency that an applicant expects to experience (on average) on the day of filing, which we have not produced here. This actual expectation is unobserved; however, the joint report construct estimates of expected pendency based on the predicted pendency from survival time regressions. See chapters 4 and 5 as well as page 22 of Mitra-Kahn, B., Marco, A., et al., 2013, "Patent backlogs, inventories, and pendency: An international framework," IPO- & USPTO joint report, <http://www.ipo.gov.uk/ipresearch-uspatlog-201306.pdf>

## 2. IP Australia – Patent Process

A simplified process map of the patent application process is presented below. This mapping highlights the waypoints between different stocks and captures important milestones and outcomes in the life of a patent.

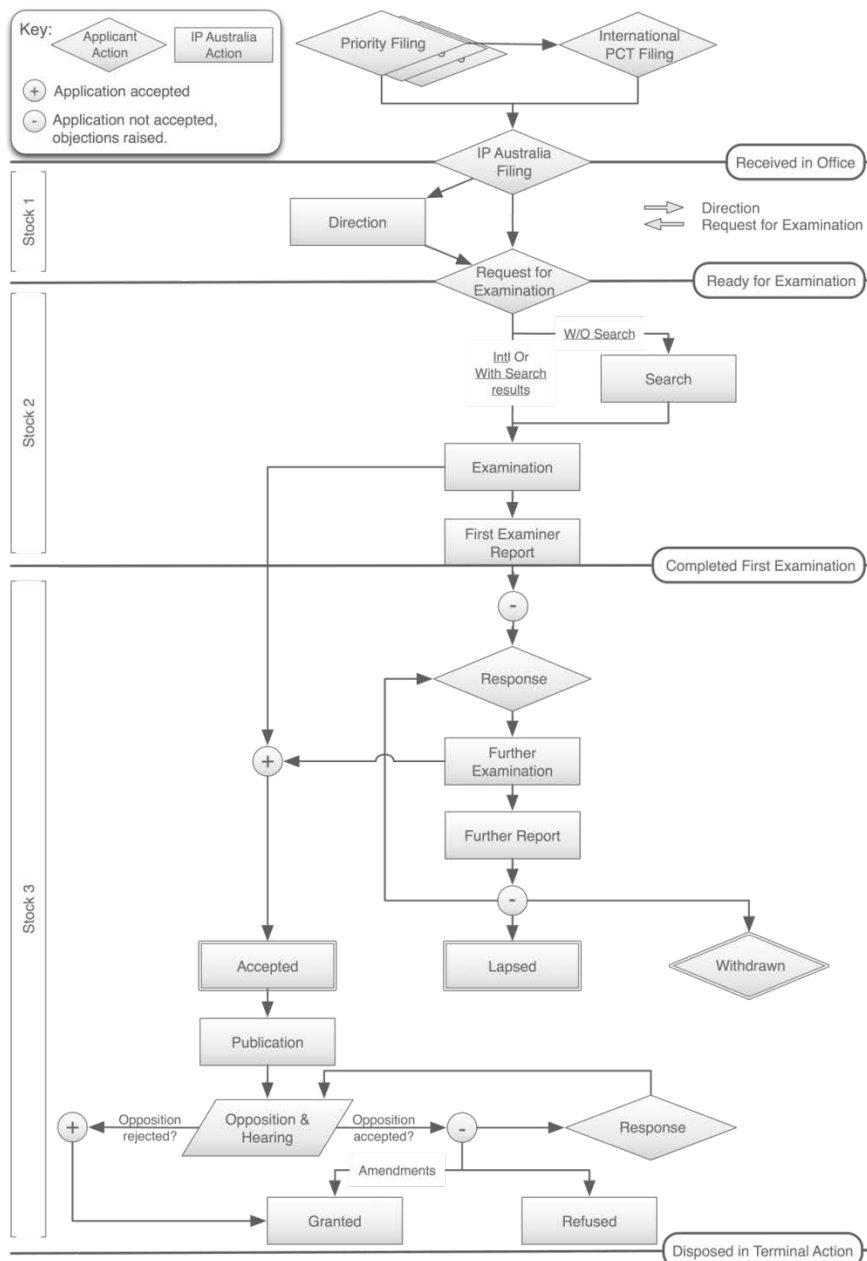


Figure 3 - Simplified process map

IP Australia operates a deferred examination system, where applicants have to request examination. Applications enter the office and applicants have up to five years to file their exam request, but the office can direct applicants to file this request. If an application is not accepted after the first examination, it progresses to a series of interactions between the office and the applicant. Once an application is accepted by the office, it enters a three month opposition period, where third parties can oppose the application. If the application is



unopposed or makes it through an opposition procedure, the applicant has to pay a granting fee before the application is granted. A more detailed description of each point in the map is described in appendix 1.

### Process in numbers

Figure 4 provides a concrete example of how a cohort of patent applications make their way through the administrative process at IP Australia, using the 2008 filing cohort (although a few of these were still pending in May 2013 when the data was extracted – and are denoted as ‘filed’ in the below figure).

Percentages in the figure refer to the total number of applications that were filed in 2008. So when 51.5% of applications go from acceptance to grant, the inference is that 51.5% of all applications filed in 2008 were granted as of May 2013. Similarly, 76% of all applications received a first report, while 79.9% of applications filed in 2008 had an examination request (achieved by adding up the arrows leading to the examination request bubble).

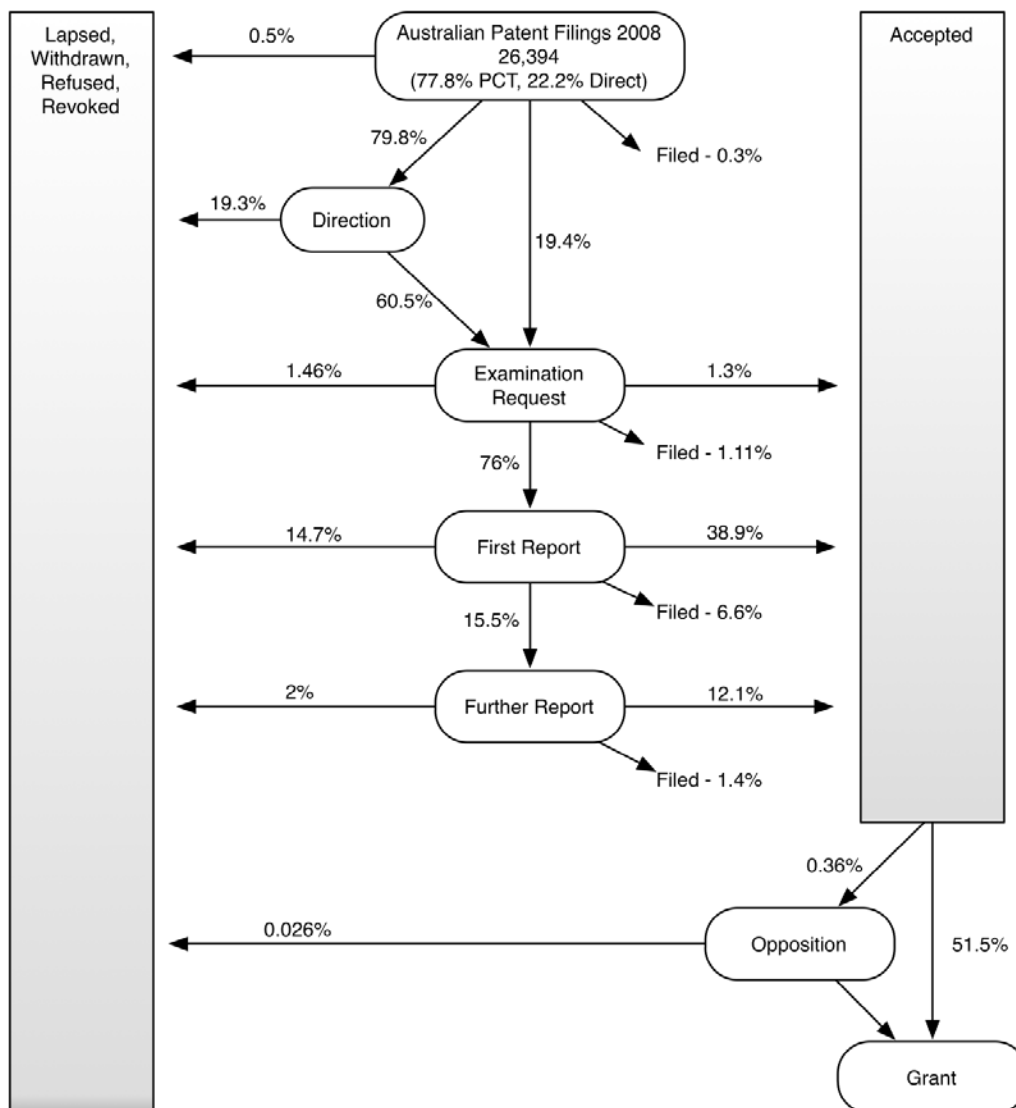


Figure 4 - Process in numbers - Year 2008<sup>6</sup>

From the 2008 cohort, approximately 52% were granted, 38% were lapsed or otherwise not granted, 9.4% were pending in May 2013 and the remaining observations were accepted and waiting.

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<sup>6</sup> The total number of applications in 2008 was 26,592, the missing 198 observations are due to data cleaning work which resulted in a few dropped observations.

### 3. Patent Application Inventories

The patent inventory at any given point is made up of several vintages of applications, and by the end of 2012, IP Australia had a total inventory of just under 90,000 applications. Figure 5 below shows a steady increase in the inventory levels since the start of 2000 that peaks just below 100,000 in October 2009. For the past three years there has been a decrease in overall inventory levels while the unexamined inventory has stabilised around 60,000, down from a high of 75,559 in March 2009.

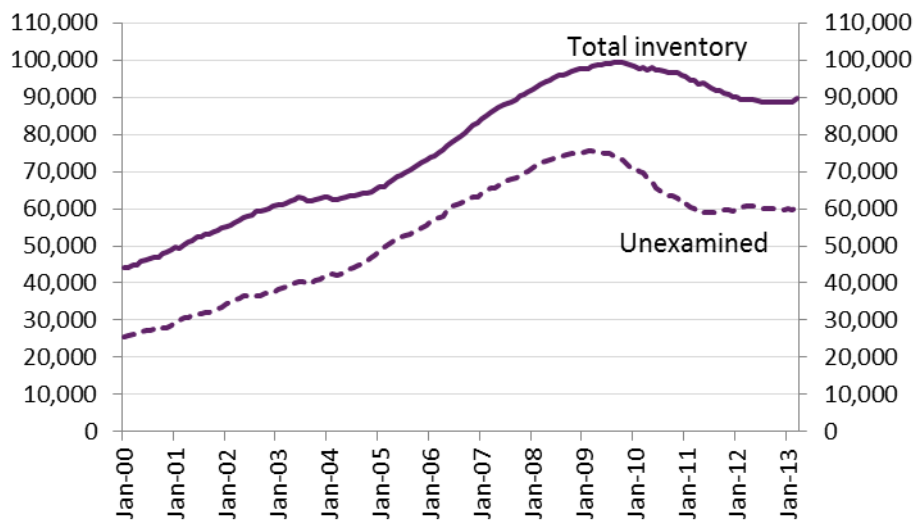


Figure 5 – IP Australia total inventory (stock 1+2+3), 2000-2013

The total inventory at IP Australia more than doubled between 2000 and 2009. The most rapid increase was experienced from January 2005 to January 2007 when inventory increased by 18,326 applications in the space of two years. From 2009 to mid-2011 there was a sharp decrease in unexamined applications indicating either a decrease in new filings or an increase in productivity in patent examination.

Figure 6 compares the total inventory in the US, the UK and Australia. The totals are decidedly different between the three offices (with the US on the right hand axis at ten times the volume of the other offices), but the US and Australia have broadly similar trends.

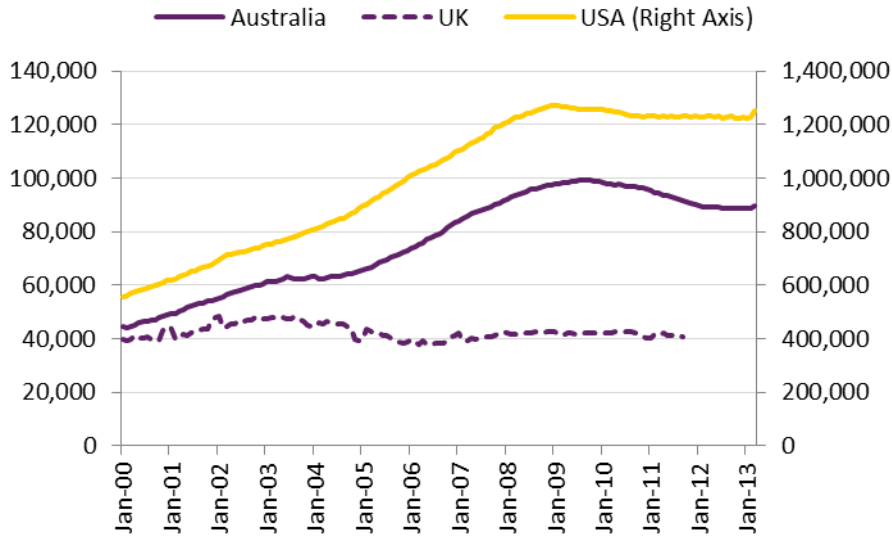


Figure 6 - Total inventory (stock 1+2+3), Australia, UK, USA, 2000-2013

This basic comparison does not provide a lot of additional information, but when we use the backlog framework we can set out the same information, and compare each stock with other offices. Figure 7 shows IP Australia’s stock levels (stacked) since 2000.<sup>7</sup> The overall increase in inventory is primarily caused by the increase in stock 1, i.e. applications that are not yet ‘ripe’ for examination.

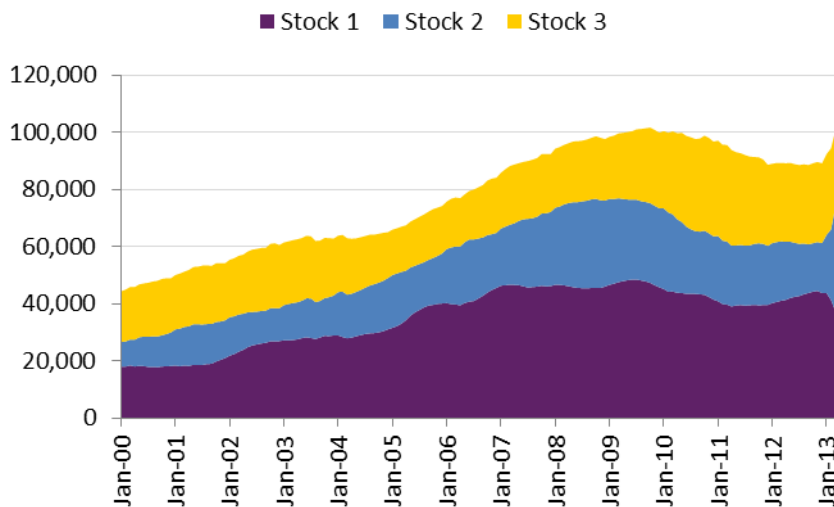


Figure 7: IP Australia Inventory, 2000-2013

Since 2007 the rate of increase in stock 1 has levelled off by moving a large number of applications from stock 1 to stock 2 causing stock 2 to double between 2005 and 2009. Since 2009 there has been a decrease in stock 2 levels, which in turn increased stock 3. The volatility at the end of the graph in March 2013 is associated with the introduction of IP Reform in April 2013. This prompted a large number of applicants to

<sup>7</sup> Combined stock levels in Figure 8 are overstated when compared to total inventory in Figure 5 due to minor double counting. Applications that move from one stock to another during a given month are counted in both stocks for figure 8, meaning the totals are over-stated by a few hundred patents per month on average.

request examination, shifting applications from stock 1 to stock 2. The sharp rise in the total inventory in 2013 was produced by early National Phase entry for a significant number of applications (following the introduction of the Raising the Bar Reforms),<sup>8</sup> which also requested examination, providing the discernable increase in both stock 2 and total inventory.

When we compare inventories across offices we see some obvious differences. The US stocks are evenly spread out and resemble to some degree the Australian inventory, although stock 2 in Australia appears to be a smaller proportion of the total. The UK-IPO on the other hand has the majority of its inventory in stock 2. For a discussion on each set of office trends, see the joint USPTO and UK-IPO report.

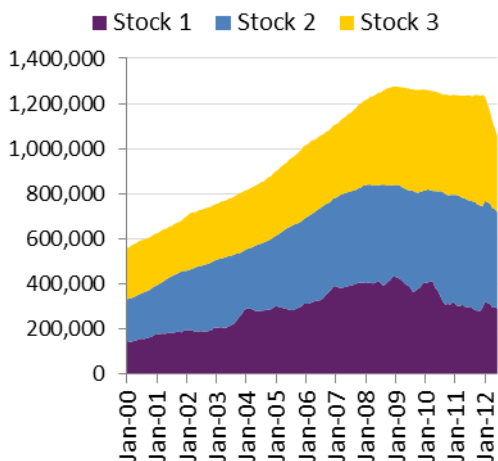


Figure 8: USPTO inventory, 2000-2012

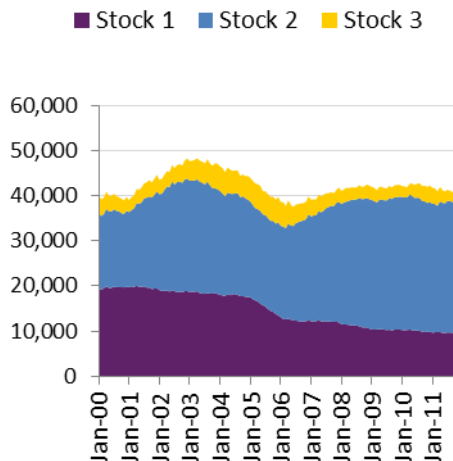


Figure 9: UK-IPO inventory, 2000-2011

Figure 10 below shows that overall stock levels at IP Australia are dominated by stock 1, and have been since 2002. Proportionately stock 1 was at its lowest in 2001 at 35 per cent and peaked at 55 per cent in 2005. This peak coincides with a drop in the number of examiners between 2002 and 2006.

Stock 2 makes up between 20 - 30 per cent of the overall inventory implying that ‘stock-out’ – the concern that examiners would run out of applications – should not have been a major concern over the past 12 years. Stock 2 peaks at 32 per cent in 2008 and has fallen to around 20 per cent since then. The decrease in the proportion of stock 2 is complimented by an increase in proportion of stock 3 to around 30 per cent of total inventory.

<sup>8</sup> See the Australian IP Report 2014, figure 18, for data on the spike in applications and exam requests prior to the full introduction of the IP Laws Amendment (Raising the Bar) on 15 April 2013. Available at <http://www.ipaustralia.gov.au/about-us/reports/australian-ip-report-2014>

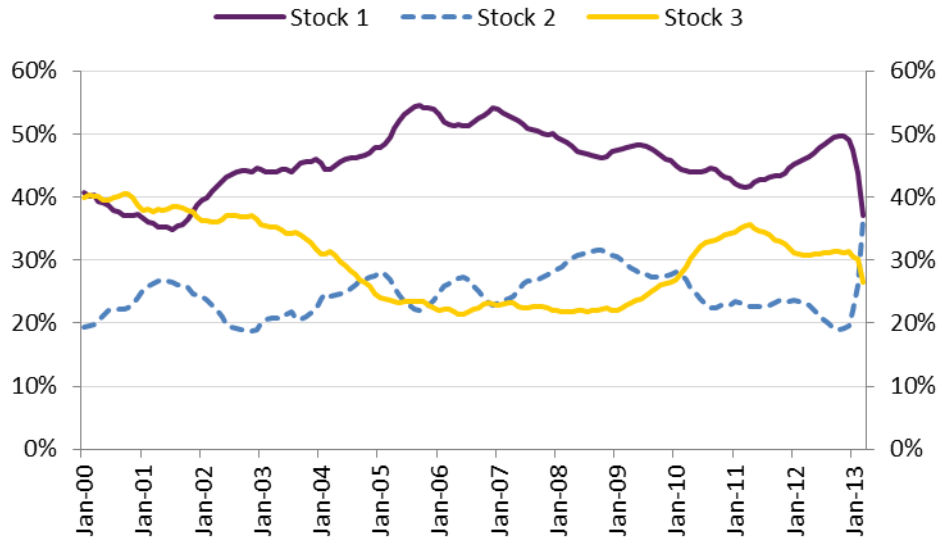


Figure 10 - Proportion of IP Australia stocks - 2000–2012

## 4. Applications and Examiners at IP Australia

Two key drivers of the inventory level are the number of examiners on staff and filings. Figure 11 shows the average annual number of examiners,<sup>9</sup> the total stock per examiner, and the number of applications filed at IP Australia (on the right hand axis).

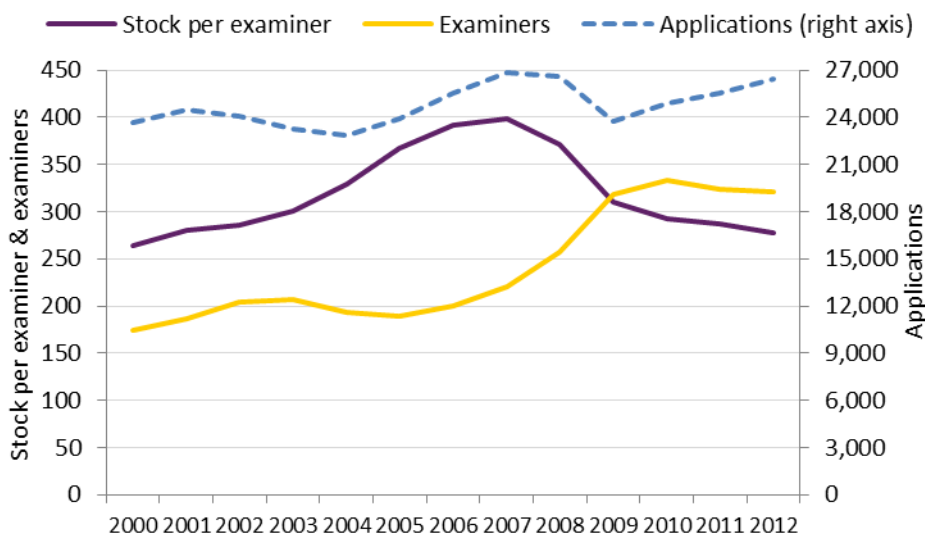


Figure 11 – Average number of examiners, stock per examiner and total applications

Figure 11 shows the expected relationships between applications and inventory, as well as examiners and inventory. More applications correlate with larger inventory, while more examiners reduce the stock per examiner. There are complexities within the system, with direct applications held within the stockpile to allow applicants to file exam requests.

The increase in the inventory during the early 2000s appears to be linked to the decreasing number of examiners between 2003 and 2006. This reduction, and fluctuation around 2005-06, in the number of examiners is correlated with an increase in the stock per examiner. From 2004 onwards applications rise and the stock per examiner begins to climb quickly. As noted in figure 5, the total stockpile doubled between 2005 and 2009, although stock per examiner begins to decline after 2007. This drop from 2007 onwards is correlated with the rapid increase in examiner numbers. From a low of 170 examiners in January 2006 the number almost doubles to more than 320 in July 2009. Since 2009 the total stock has stabilised, and stock per examiner has slowly declined, with an average 292 applications per examiner.

The increase in the number of examiners since 2006 has enabled IP Australia to stabilise the number of applications per examiners and also reduce the overall inventory levels. Comparing this with the US and UK

<sup>9</sup> The number of examiners include staff who are active in patent examination, and the general managers overseeing the patent examination sections. The totals do not directly represent work effort on examining applications as some effort is spent on international search tasks - not part of the backlog.

offices, we see that Australian examiners had 89 more applications in the stock than the UK in 2011, and 124 more than the USPTO in 2012.<sup>10</sup>

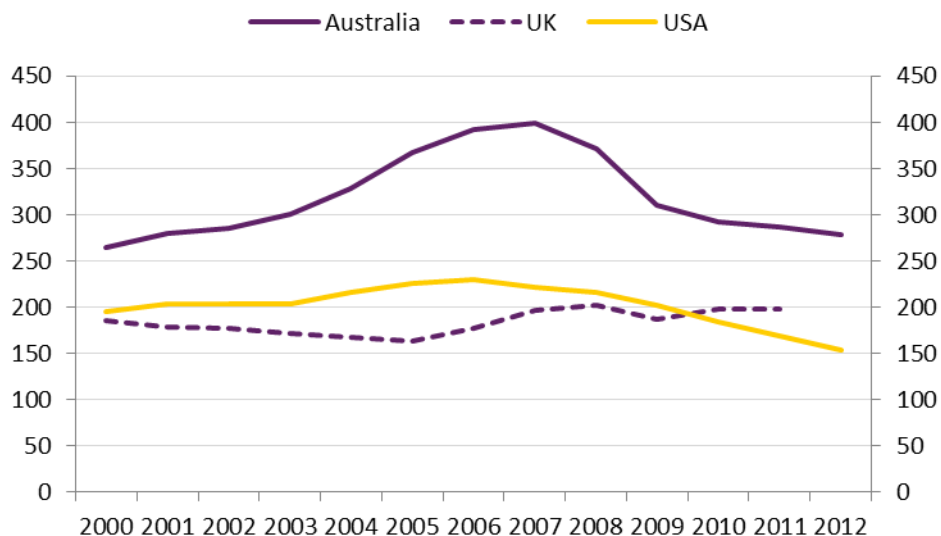


Figure 12 – Stock per examiner at IP Australia, UK-IPO and USPTO, annual figures

Over the period, it is clear that IP Australia has had a much larger stock of applications in relation to its number of examiners when compared to the USPTO and UK-IPO, even if the current stock per examiner of 278 is the lowest since 2001. Part of the reason for this will be the deferred examination model at IP Australia, where applications are allowed to sit in the office for an extended period of time before being actioned. This means that the total pending stockpile per examiner would be larger than in offices where the majority of applications are pending an office action.

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<sup>10</sup> Annual figures are calculated as the annual mean for each office



## 5. Pendency Analysis

Following the joint report by the USPTO and UK-IPO, “the primary cost associated with backlogs is increased delays in processing pending patent applications”.<sup>11</sup> The results of the US and UK office analysis shows that depending on the office, different stocks have different but significant impacts on pendency. In the UK, stock 2 sitting outside the office and waiting for applicants to take action leads to longer pendency, while increases in both stock 1 and 2 impact pendency and first action times at the USPTO.

For applicants pendency is generally seen as the time taken for a grant; for IP Australia it is the time taken for application to get off the inventory. Some pendency can also be attributed to applicant behaviour as not all applicants are keen to proceed with timely examinations, and the deferred examination system is geared toward providing for such applicants.

### Exit Pendency

Exit pendency is the most commonly cited measure of pendency. It measures how long the average application granted at a given date spent in the patent system. The advantage of using exit pendency is that it can be calculated and observed for all applications that have been granted to date. Figure 13 shows the average (mean and median) exit pendency for granted patents at IP Australia since 2000, as well as the 25<sup>th</sup> and 75<sup>th</sup> percentile.

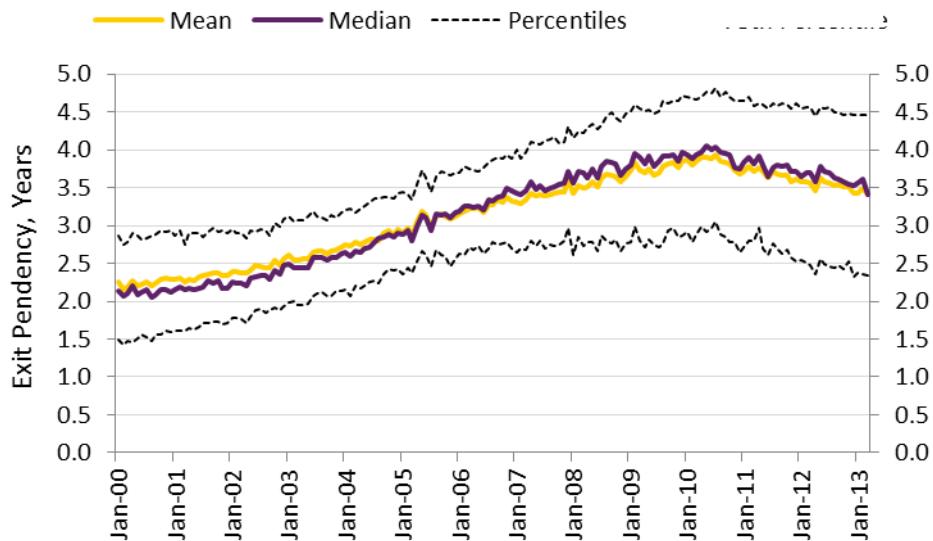


Figure 13 - Exit pendency of granted applications

<sup>11</sup> See page 1 of the joint report. Mitra-Kahn, B., Marco, A., et al., 2013, “Patent backlogs, inventories, and pendency: An international framework,” IPO- & USPTO joint report, <http://www.ipo.gov.uk/ipresearch-uspatlog-201306.pdf>

The most obvious change over the period 2000-2013 is the increase in exit pendency. Median exit pendency for patent applications filed at IP Australia has increased by about 2 years from 2000 to 2010, although it had fallen by half a year from 2010 to 2013. As well as a shift in the average, the distribution of pendency times has widened considerably, as illustrated below. Figure 14 shows the median, 25<sup>th</sup> percentile and 75<sup>th</sup> percentile, and how different they were from the mean.

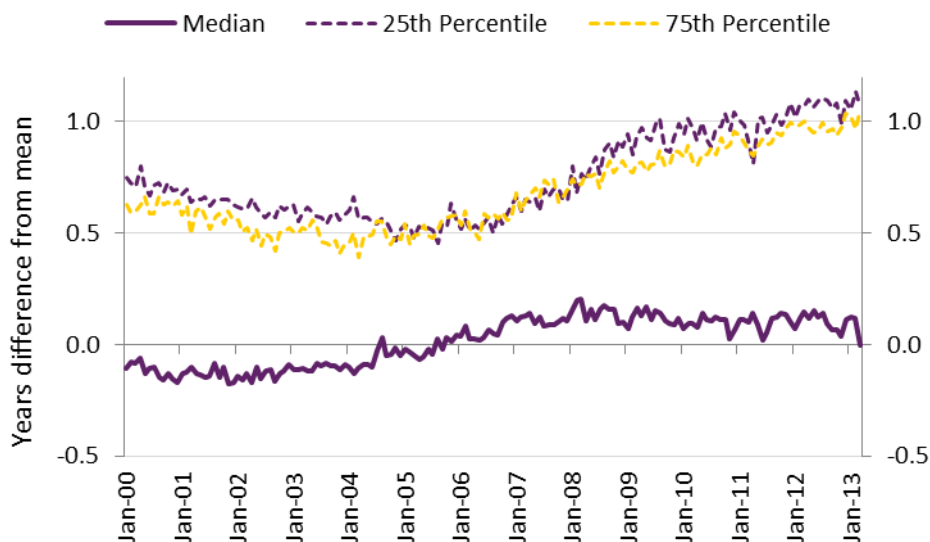


Figure 14 – Exit pendency, difference from mean

In 2000, 50 per cent of patents were disposed of within 7 to 10 months of the mean pendency. By 2013 this increased to just over a year. And with reference to the relative position of the median, unlike in the early 2000s where applicants were more likely to have an application disposed of in less than the mean time to grant (i.e. the distribution is skewed to the left), at any point beyond 2006 the median moves permanently above the mean indicating the opposite: An application is likely to take longer than the mean time to grant (i.e. the distribution is skewed to the right).

Comparing the medians across countries, we see that the US and Australia followed similar patterns (where data is available), with exit pendency rising steadily during the 2000s. Around 2009 this trend reverses for IP Australia, and the available data for the USPTO appears to suggest a similar trend. Bear in mind the different systems here: IP Australia allows applicants 5 years from filing to exam request, the UK-IPO has a 12 month deadline,<sup>12</sup> while the USPTO can commence searching once the application is filed.

<sup>12</sup> Strictly speaking, the UK-IPO deadline is the later date of 2 months from your filing date or 12 months from your priority date. See p. 24 at <http://www.ipo.gov.uk/p-apply.pdf>

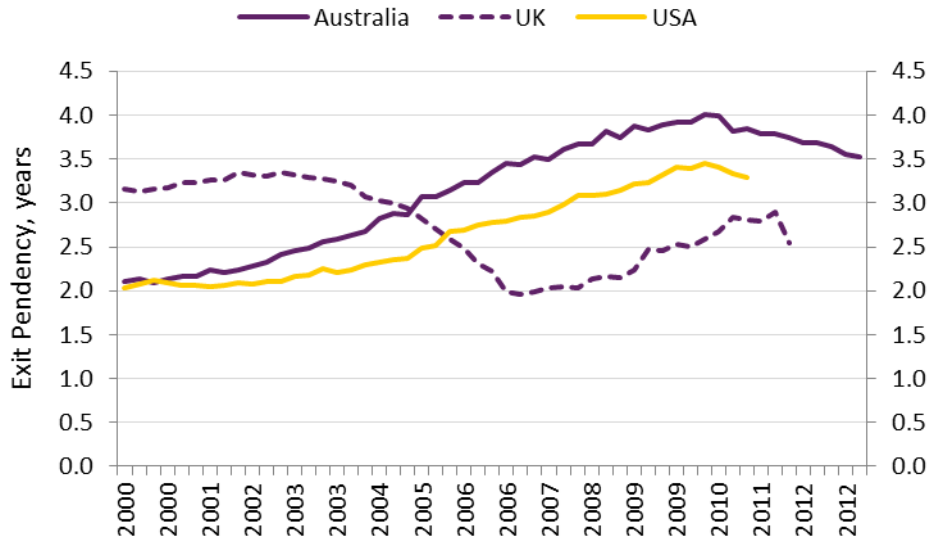


Figure 15 – Exit pendancy, Quarterly averages of the median: IP Australia, USPTO, UK-IPO

The UK-IPO has its own trajectory, which according to the joint report of the US and UK offices have been driven by the two-tier application tracks available to applicants as well as office targets.

### Entry Pendancy

Entry pendancy measures the time to grant for all applications that are filed at the same time. Using this measure, it can be observed how time to disposal changes with additional new applications. A drawback for this measure is censoring as the measure is not accurate until a large majority of applications are granted. Figure 16 shows entry pendancy for all granted applications filed since 1995 with IP Australia.

Again, the most obvious change is the increase in the time to disposal from the low median of 2.01 years for applications filed in November 1997 to the highest median time to disposal of 4.12 years which is observed for applications filed in June 2006. There appears to be a structural break around June 2002 where the median pendancy jumps six months, but it is not clear what – if anything – was the cause of this.

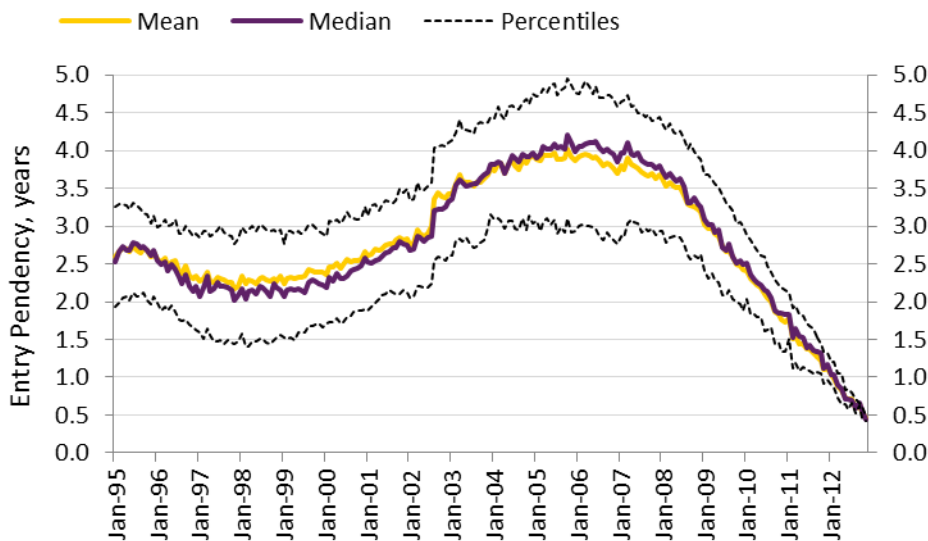


Figure 16 - Entry pendancy of granted applications

This entry pendency data suggests that the trend for pendency to rise was reversed around 2007, but due to the censoring effect all indicators may be understated for after 2008. Since 2004 the 25th percentile shows a flat or decreasing trend that may suggest that the productivity increase of 2007-2009 focused on recent applications rather than older applications, this would have to be further investigated. This is also suggested by the mean being less than the median since 2005.

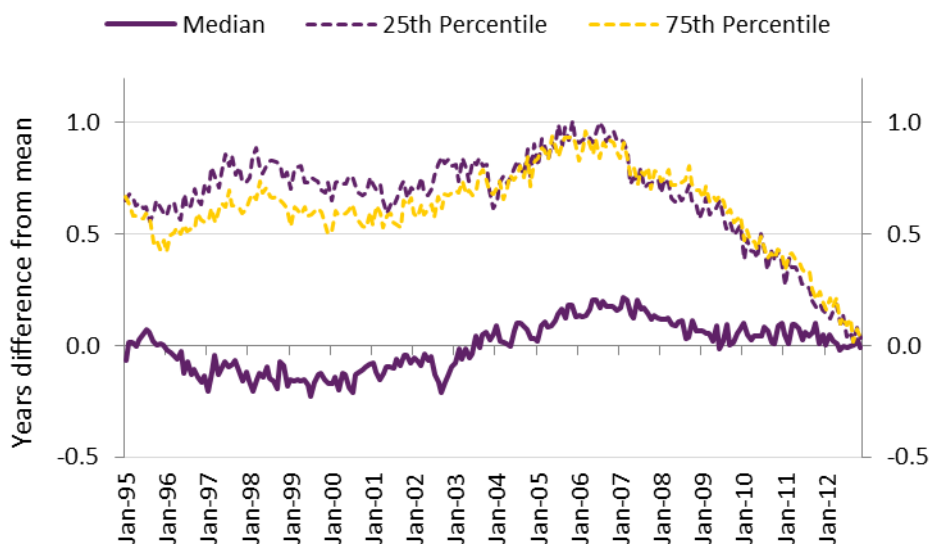


Figure 17 - Entry pendency difference from the mean

Entry pendency suffered a significant increase of 6 months in June 2002. As average entry pendency prior to this was 2.5 years, it can be estimated that these applications were processed between 2002 and 2006. This corresponds to the same period when total number of examiners first declined and then fluctuated at IP Australia.

Internationally we observe similar trends in entry pendency as we did for exit pendency (figure 18). Applications filed in 2008 took on average 3.7 years to be granted in Australia, while the same cohort took around 3 years in the US and 2.3 years in the UK.

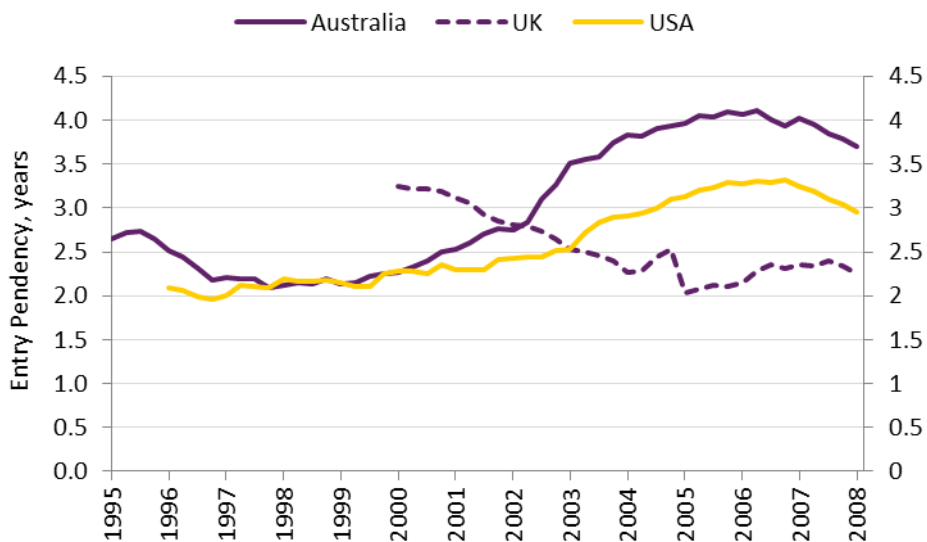


Figure 18 – Entry pendency, Quarterly median average: IP Australia, UK-IPO and USPTO

## 6. Effects of Direction

One issue that affects pendency and the size of stock 1 is that of 'direction'. After filing an application with IP Australia, an applicant has up to five years to request an examination. During these five years IP Australia may choose to issue a direction to any applicant, and this direction requires the applicant to file a request for examination within six months. As quite a large proportion of applications are directed, 80 per cent of the 2008 cohort for example, it is important to explore differences between directed or voluntary examination requests.

### Directed vs. Voluntary Examination Requests

The figure on the left below (figure 19) shows all applications that were directed between 1995 and 2008. It is evident that the majority of applicant's chose to submit a request for examination as late as possible with more than 80,000 requests being submitted in the sixth and final month. The bars indicate the total number of exam requests, with yellow showing the number that eventually lapsed, and purple indicating applications eventually granted.

The acceptance percentage (as indicated by the black line) is inversely related to the time an applicant takes to submit a request, especially where applicants are late in submitting the exam request, and only file in the seventh month. If direction is used to ensure that enough applications are being processed by examiners in stock 2, then this graph shows that IP Australia can expect a lag of six months before applicant files a request for examination.<sup>13</sup> Figure 20 on the right shows applicants who voluntarily submitted exam requests. The overall numbers in figure 20 are much lower than directed applications and the trends are almost opposite to directed requests.

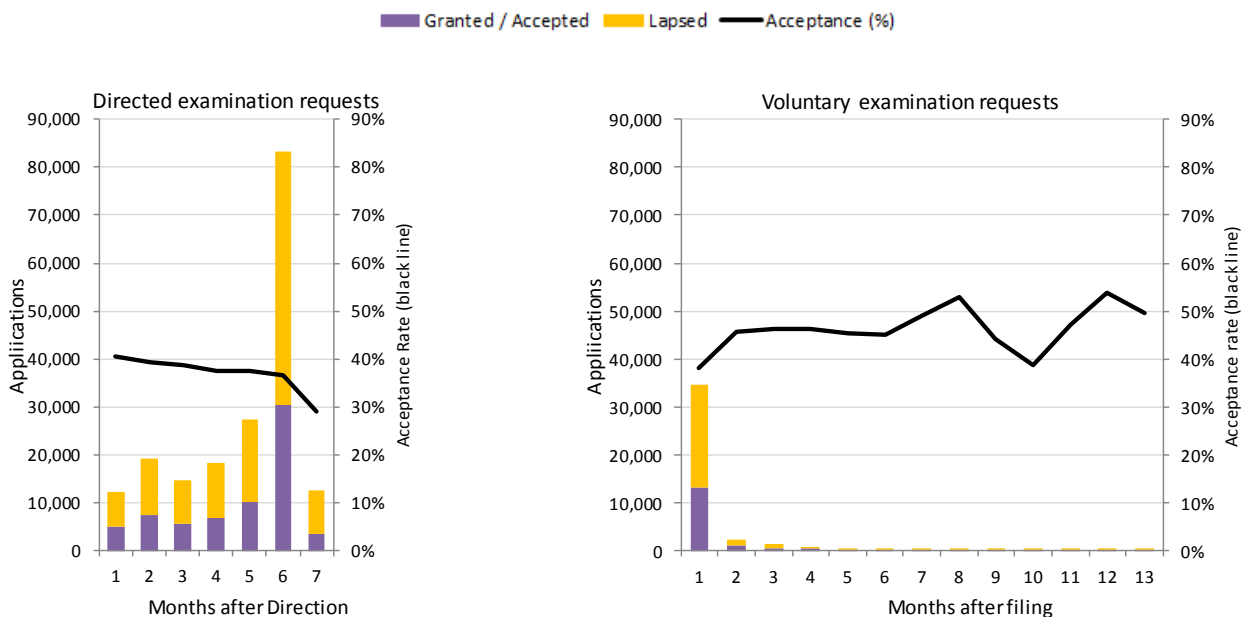


Figure 19 - Directed examination requests

Figure 20 - Voluntary examination requests

<sup>13</sup> As of April 2013 this has been reduced to two months with the Raising the Bar reform.

Applicants who request examination without a direction have done so overwhelmingly in the first month after filing. The number of voluntary requests drops drastically after the first month. Six months after filing, less than 500 applications are requested for examination in each passing month.

There is a pronounced increase in the acceptance rate from applications that file an exam request in the first month (38 per cent) to the second month (46 per cent), and this higher rate is observed in the data for exam requests filed over the next 6 months.

Over the period, the acceptance rate of directed applications has fallen considerably: from 80% for applications directed in the first quarter of 2000, to less than 50% for applications directed in the last quarter of 2008. Figure 21 below shows a divergence that highlights the decreasing proportion of directed applications being accepted. During the same period, the number of grants on voluntary requests has remained relatively stable.

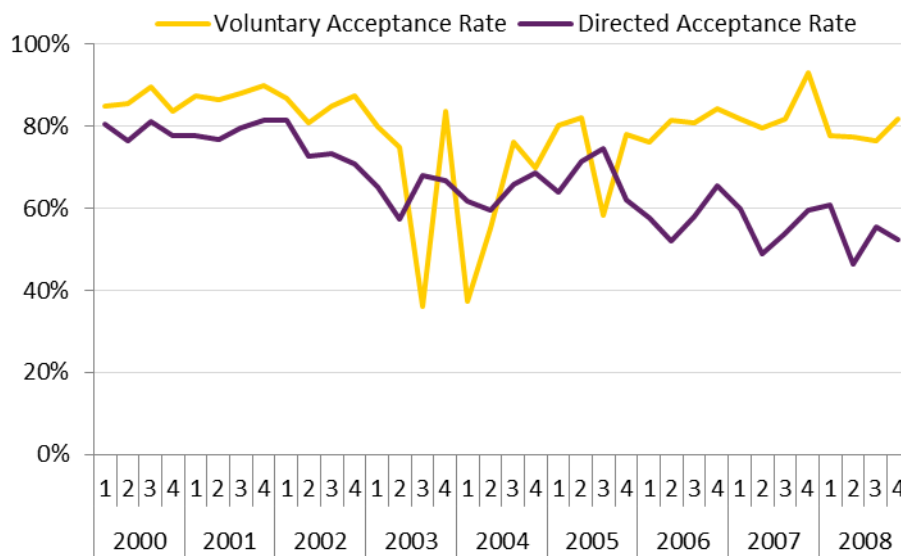


Figure 21 – Acceptance rates by time of direction or exam request

This suggests there is a difference between applications that are directed and those that arrive voluntarily which have to be considered when planning workload.

## 7. Stockpiles by International Patent Classification

The backlogs framework can be applied to individual technology classes. This disaggregated analysis can be used to identify significant differences across examination areas and allows for improvements to resource management. In this report the analysis is limited to the first International Patent Classification (IPC) code for the patent.<sup>14</sup>

These IPC codes do not correspond directly to IP Australia's technology centres or examination groups, partly because exam groups span a number of main IPC codes. This is to be expected as exam groups are focused on broad technologies while the IPC main sectors provide the upper hierarchy for a system that classifies thousands of specific technologies within a science or subject area. IP Australia currently has 11 main examination groups as illustrated in table 2, which shows the group that is allocated applications assigned a certain IPC class mark.

		Examination Group										
		A2	A3	A4	B1	B2	B3	B4	C2	C3	C4	C5
Main IPC Code	A Human Necessities	X	X	X	X	X	X	X			X	X
	B Operations; Transport		X	X	X					X	X	X
	C Chemistry	X	X		X	X	X	X	X			
	D Textiles; Paper			X	X				X			X
	E Fixed Construction				X							X
	F Mechanical Engineering		X	X	X						X	X
	G Physics	X	X			X				X	X	

<sup>14</sup> International Patent Classification code from the World Intellectual Property Organization



Table 2 – Main first IPC code and exam group initial allocation (June 2013)

The eight main technology classes provide one view of what type of application is filed with IP Australia.<sup>15</sup> For each IPC class we include the approximate percentage of the total stock taken up by each classification (these are relatively stable over time), the major ones being Human Necessities (class A) with 37 per cent of the stockpile on average, and chemistry which makes up 17% of the stockpile on average. Note that the y-axis on the below charts differ due to the wide range of the stocks. The maximums on the charts range from 45,000 for IPC code A, through 20,000 (B,C,G), 10,000 (E,F,H) and finally 1,400 in the smallest IPC code: D.

While this gives an idea of what technologies the majority of the current inventory is located in, it cannot help directly with planning for backlog management. A recommendation of this report is for IP Australia to extract the information on which exam group holds which inventory from the work-flow system (PAMS) in order to allow for clearer analysis of work loading and workforce planning. In the absence of such data, this section shows the great variety of backlogs between each IPC.

**IPC Header: A - Human Necessities (37 per cent)**

The class for Human Necessities is the biggest technology section at IP Australia, accounting for an average 37 per cent of the overall inventory levels since 2000, but it has grown as a proportion of the total from 35% in 2000 to just over 40% in 2012. Stock 1 increased four-fold from just over 5,000 in 2000 to 20,000 in 2009. During this period, the proportion of Stock 3 fell from being the highest (45 per cent) to being the lowest (20 per cent).

Since 2009, the overall inventory levels have fallen, as both stock 1 and 2 has fallen. Stock 3 is on the increase, so while more inventory is being processed in stock 1 and 2, it appears to stay in stock 3. With stock 1 holding steady since 2011, a further drop in overall inventory level would not be foreseen and stock 1 should continue to dominate the overall inventory level in this IPC. As this inventory constitutes the largest proportion of IP Australia’s total inventory, any major changes in its levels would impact overall inventory levels the most.

<sup>15</sup> IPC classes may not necessarily identify the correct industry the patent originates from, although work from WIPO would allow us to sub-divide the more detailed classifications into industry clusters. See Schmoch, U. 2008. “Concept of Technology Classification for Country Comparisons.” Final Report to the World Intellectual Property Organisation (WIPO), June

[http://www.wipo.int/edocs/mdocs/classifications/en/ipc\\_ce\\_41/ipc\\_ce\\_41\\_5-annex1.pdf](http://www.wipo.int/edocs/mdocs/classifications/en/ipc_ce_41/ipc_ce_41_5-annex1.pdf)



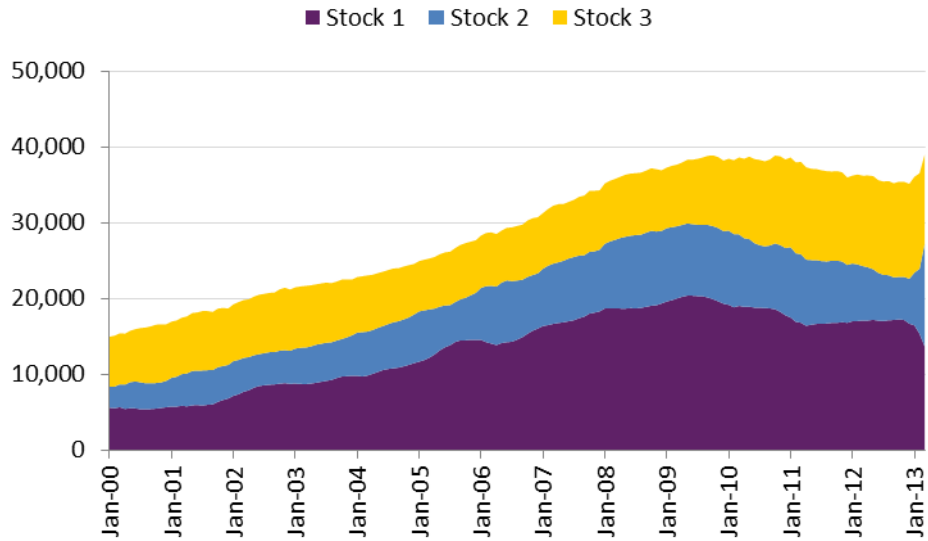


Figure 22 - A Stocks

**IPC Header: B - Performing Operations; Transporting (15 per cent)**

Applications whose main IPC class is B did not experience a rapid increase in overall inventory levels until 2005. Between 2005 and 2009 overall inventory levels go up by 44 per cent primarily driven by Stock 1 increases. This increase in the absolute number of stock is consistent with the general increase in inventory, and through the period applications with a B classification were 14% of the total stock from January 2004 through November 2008.

The initial increase in stock 1 levels during 2006 then led to a subsequent increase in the level of stock 2 between 2007 and 2009. This increase in stock 2 in turn appears to result in an increase in stock 3 in subsequent years. By 2011, the inventory levels came down substantially as a majority of applications left stock 3, there was no growth in stocks 1 or 2. Over the last year we do observe a sharp increase in stock 1 that may translate into an increase in overall inventory and also a subsequent increase in stock 2 and stock 3.

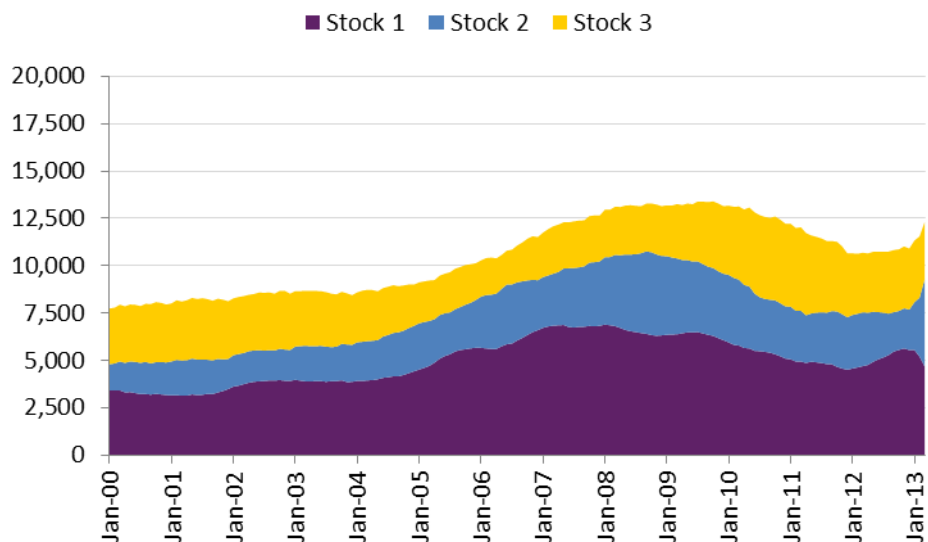


Figure 23 - B Stocks

### IPC Header: C - Chemistry (17 per cent)

The inventory levels for applications in classification C more than doubled between 2000 and 2009, climbing from 17% to 19% of the total stockpile by 2007, but falling back to 17% by 2009. Stock 1 experienced a rapid increase till 2007, going from 2,500 to more than 7,000 applications in the inventory, and then steadily decreased afterwards.

From 2007 onwards a large number of applications were pending in stock 2 that continued to keep overall inventory levels high. The decrease in overall inventory levels in 2009 coincides with a rapid decrease in stock 2 levels. This large proportion of application stuck in stock 2 may indicate an increase in examination requests or a sharp reduction in the section's human resource capacity. More data on examiner numbers and distribution would allow for more thorough analysis of any potential causes. Since 2010, stock 1 has remained steady and stock 2 and overall inventory levels have come down substantially. With such a low proportion of applications now in stock 2, one might expect, holding all other things constant, that stock 3 levels would continue to fall for next few years.

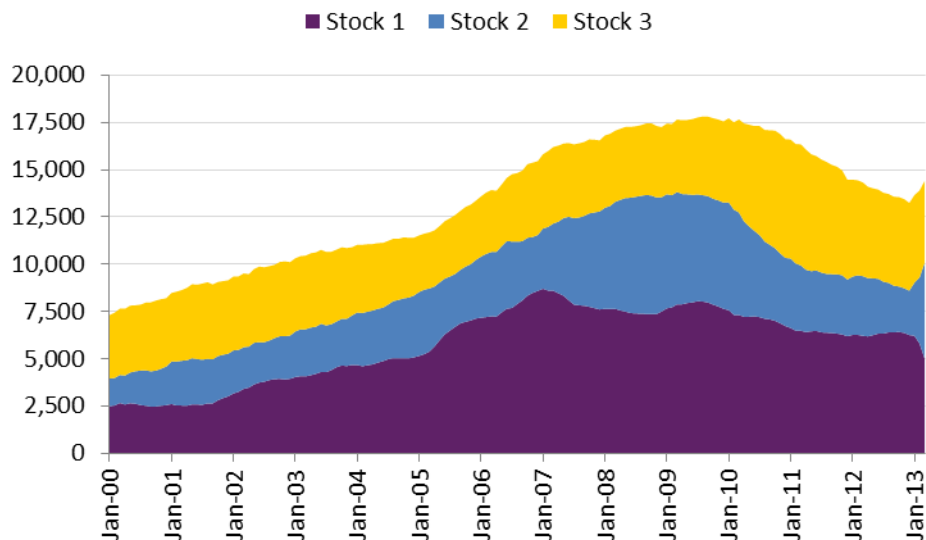


Figure 24 - C Stocks

### IPC Header: D - Textiles; Paper (1 per cent)

This section has the lowest volume of all sections with less than 1,000 applications in the inventory for any given month. Similar to applications classified in IPC codes B and C, this class of applications also experienced growth in overall inventory, doubling between 2004 and 2009, primarily driven by stock 1.

As with the stock of applications in IPC class B and C, the percentage of total applications residing in D was flat from 2000 to 2009, at approximately 1% of the total inventory. By 2011 the overall inventory level fell back to early 2000 levels, although this represents only 0.6% of the total inventory, so a relative fall. The increase in stock 1 during 2004-2007 is again followed by an increase in stock 2 and a subsequent increase in stock 3.

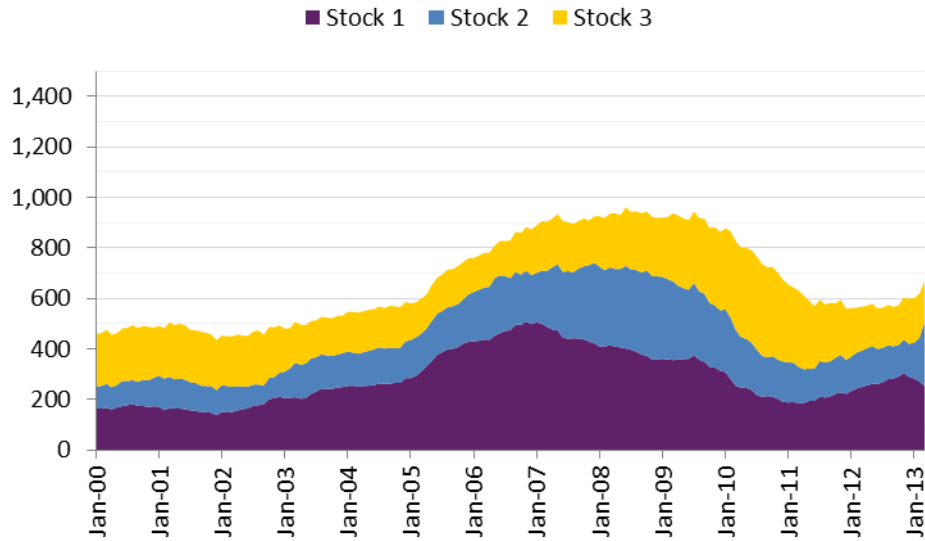


Figure 25 - D Stocks

**IPC Header: E - Fixed Construction (5 per cent)**

Applications classified in IPC section E has shown a continuous growth since 2000. Its relatively rapid growth period matches that of other IPC classes as it maintained its share of total inventory, but it has continued to grow after 2009, making up 6% of the inventory in 2012, up from 5% in 2011. Inventory levels have doubled and stock 1 is the primary driver of the overall inventory in this section with its share growing from less than 40 per cent in 2000 to more than 50 per cent in 2012. Such a continuous growth in stock 1 can be attributed to increasing number of applications being filed every year but no corresponding requests to examine.

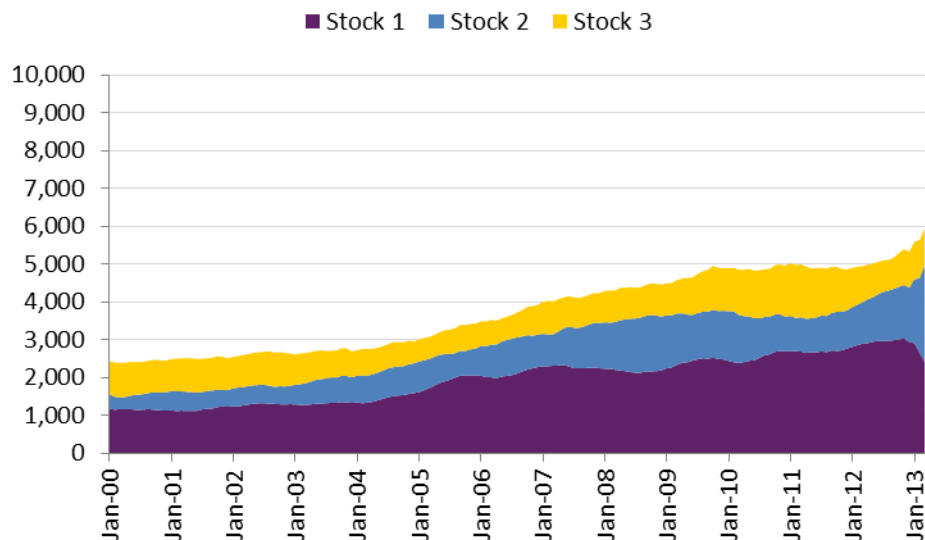


Figure 26 - E Stocks

**IPC Header: F - Mechanical Engineering; Lighting; Heating; Weapons; Blasting (5 per cent)**

Section F experienced an increase in inventory between 2000 and 2009, and this corresponded to the general increase across the total inventory. Since 2009 it has plateaued just above 5,000, making up five to six per cent of the total inventory over the whole period.

There is a sharp increase in stock 1 in 2012-13 that may affect overall inventory levels in the near term and also stock 2 and 3 levels over the next few years. Unlike some other sections, this section does not show a decline in its stock 1, indicating that new applications continue to be filed at the same rate as requests for exams come in.

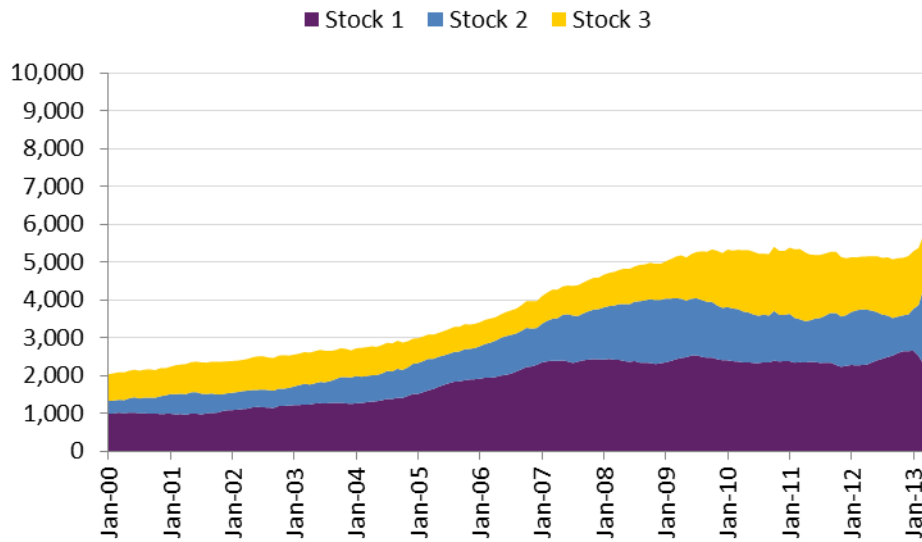


Figure 27 - F Stocks

### IPC Header: G - Physics (12 per cent)

This technology section shows the same inventory trends as some of the other sections. Since 2000, overall inventory levels increased rapidly from around 4,000 to 13,000 in 2009, tripling the inventory. This meant that applications classified in G went from 10% of the inventory in 2000 to 13% in 2009. Post 2009 there is a decline in overall inventory levels with more applications transitioning through stock 2 and 3, although the total inventory has remained at 13% of the total.

Similar to some other IPC sections, a substantial increase in stock 1 is observed from 2011 onwards, and this may increase other stock levels and overall inventory levels in subsequent years. The significant contraction of stock 2 between 2008 and 2010 indicate a high number of applications being processed through stock 2 during this period.

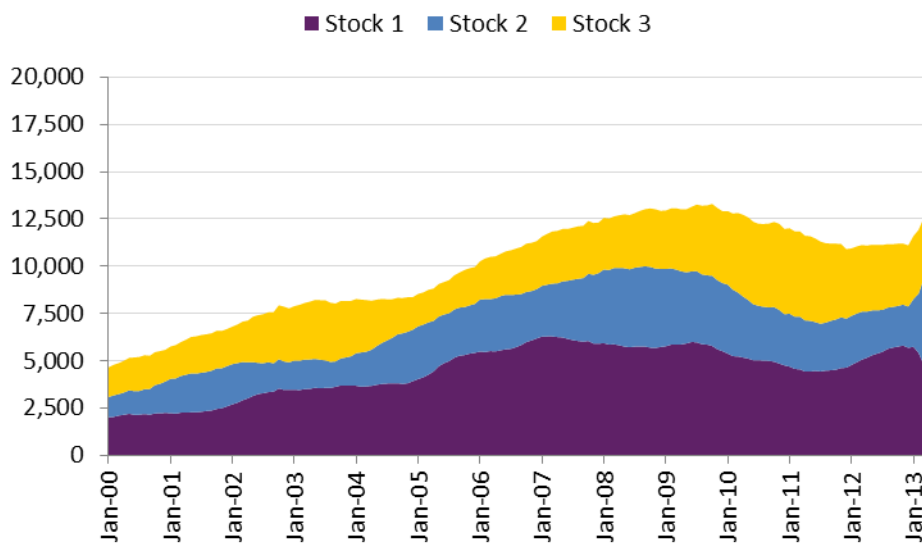


Figure 28 - G Stocks

### IPC Header: H - Electricity (8 per cent)

This is the only section where overall inventory levels have not grown over time, and the stock has therefore declined as a percentage of the total stock from 11% in 2000 to 6% in 2012. The IPC section has experienced fluctuations in its inventory and stock levels, with inventory fluctuating between 4,000 and 7,000 in any given month.

Stock 1 levels declined by half between 2006 and 2011 but a sharp increase is observed for 2012. As evidenced in all stock levels, this sharp increase suggests future increases in stock 2 and 3 levels in coming years.

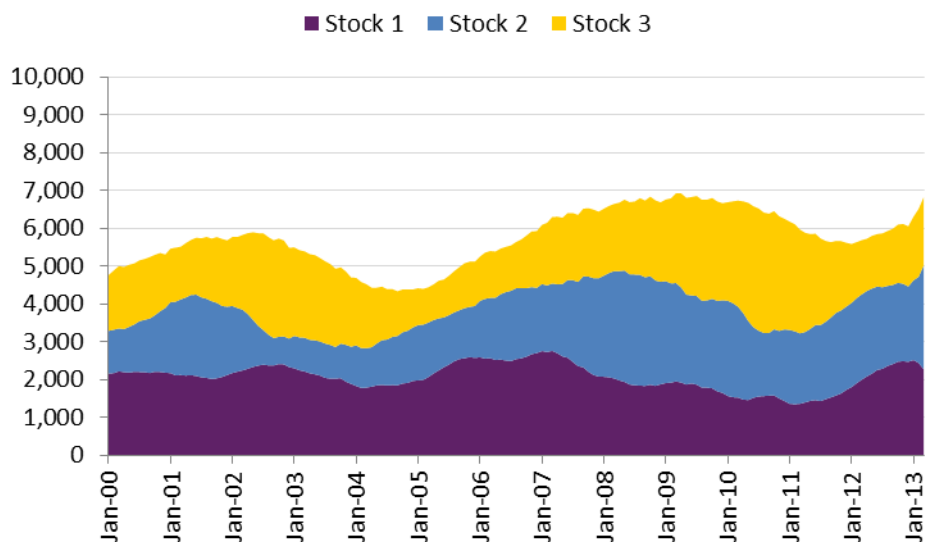


Figure 29 - H Stocks

### Pendency by Technology

These IPC codes can be combined with the measures of pendency to analyse whether certain technology groups move through the patent process faster. Indeed, the analysis can be broken down by any sub-grouping relevant to the patent process. In this instance we look at different pendency by the first international patent classification (IPC) assigned to a patent application, and limit the criteria to one of the eight main sections.

Section A (Human necessities) and C (chemistry) are the two highest volume sections in IP Australia and their average pendency is slightly greater than the mean, but one would expect them to track the average closely. Given that these applications constitute more than 50 per cent of the inventory, they are the most important drivers of overall pendency. Section G (Physics) and H (Electricity) are relatively low volume sections and their average pendency is significantly shorter than the overall pendency. Figure 29 shows the average annual difference from the mean entry pendency for each of these IPC sections, highlighting that applications filed in 2008 and classified H were on average granted six months faster than the mean IP Australia patent application filed in 2008.

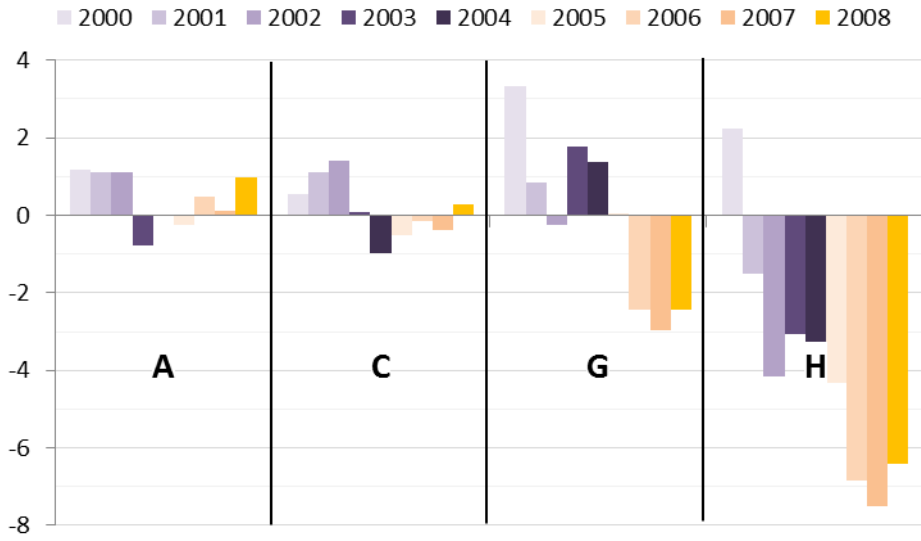


Figure 30 - Average entry pendency of selected technology sections

## 8. Conclusion

The total inventory at IP Australia more than doubled between 2000 and 2009. This growth in inventory peaked around 100,000 applications in 2010 and has fallen steadily since then. By the start of 2013, IP Australia had a total inventory of just under 90,000 applications.

The growth in the early 2000s is correlated with the increasing number of applications filed every year but primarily with the low number of examiners on staff between 2003 and 2006. The falling number of applications after the GFC (which have just recovered to pre-GFC levels) and the increase in the number of examiners since 2006 appears to have enabled IP Australia to stabilise the number of applications per examiners and also reduce the overall inventory levels.

Median exit pendency (i.e. the time it took for applications to be granted) for applications filed at IP Australia has increased by about 2 years from 2000 to 2010. Applications granted since 2010 have been granted faster, and from 2010 to 2013 exit pendency had fallen by half a year.

Interaction with examiners revealed that there is a range of prioritization mechanisms in place to order the processing of applications, and there are guiding principles in place within the examiners manual of practice.<sup>16</sup> There is a managed workflow system where a bulk of applications are released, with older cases flagged for action. Examiners can pick and choose which application to examine although there are informal procedures in place to manage the assignment of applications to examiners. There are systems in place to load older cases into the queue, but there is a possibility of working through low-effort cases and queuing up of complex cases.

### Recommendations

Based on interactions with examiners, study of the patent process (both formal and informal) and quantitative analysis done for this study, the following is recommended:

- Capture and make available suitable data points to identify 'inside' and 'outside' inventories. This would allow the office to see whether inventories are sitting with applicants; how long applicants and the office spend on each action; and look in detail on the deadlines and processing times currently in place.
- Capture and make available more data points to assess complexity or nature of the patent application. This information can be used to prioritize examinations, plan human resource and assess effort required to examine inventory. These data points could be the number of claims, prior art search availability, completeness of application etc.

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<sup>16</sup> See for example the Patent Manual of Practice & Procedure 2.13.4.2 and examination priorities at 2.2.5, available at [http://docstore.aipo.gov.au/intranet/docstore/technical\\_communications/Patent\\_Examiners\\_Manual/WebHelpFullVersion/Patent\\_Examiners\\_Manual.htm](http://docstore.aipo.gov.au/intranet/docstore/technical_communications/Patent_Examiners_Manual/WebHelpFullVersion/Patent_Examiners_Manual.htm)



- Identify fast tracked applications and their impact on overall pendency and inventory levels by flagging them in the reporting systems. This would allow the office to analyse whether such applications require more examiner activity, and what their impact is on workflow.<sup>17</sup>
- Extract data from the workflow system (PAMS) on what applications are with each exam group. This would allow for better management of inventories and offer greater information for planning purposes.<sup>18</sup>
- A better measure is needed to identify examiners and their time available for examination. This would allow for better modelling of labour inputs, but would also provide information on the capacity of the examination core. The data currently available relies on self-reported hours, which do not appear robust for analysis.

An institutionalized process of prioritizing applications for examination groups would be recommended. The current informal process may have gaps, and there may be a possibility to tailor the release of cases to examiners based on technology, specialisation or individual inventories, as opposed to releasing a bulk of applications.

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<sup>17</sup> Since the completion of this report, this has been implemented internally

<sup>18</sup> Since the completion of this report, this has been implemented internally

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## Appendix 1: IP Australia patent prosecution process in further detail

### Priority Filing

Provisional application containing just the description of the patent claim can be filed to get a priority date. This 'priority date' of a patent claim is important in determining that the requirements for patentability of an invention have been met. The requirement for novelty and inventive steps are assessed against the prior art, as it existed before the priority date. Multiple provisional applications can be filed covering different aspects of the invention and can be combined into one complete application. This filing can be done in Australia or any other compliant international patent office.

### International PCT Filing

An applicant may elect to file a complete application with the Patent Office under the Patent Cooperation Treaty (PCT). A PCT application designates all the jurisdictions that are parties to the PCT (including Australia), and secures an international priority date.

### IP Australia Complete Filing

The applicant has 12 months from the earliest priority date to complete the patent application. A complete application must contain a full description of the invention, together with claims, and an abstract summarizing the invention being disclosed. A complete application may be based on one or more provisional applications and only those claims that are 'fairly based' on the relevant provisional application will be entitled to the priority date of the provisional application. An applicant may also choose to file a complete patent application without going through provisional application. Each patent application may claim protection for a single invention. However if an application is examined and is found to cover more than 1 invention, the applicant may elect to divide the application and file 'divisional applications'. These divisional applications are regarded as complete applications and follow the same process. For the purpose of this report these are taken as separate applications.

### Request for Examination

Once a patent application is complete, the applicant has 5 years before requesting for examination. IP Australia may also choose to direct the applicant to file request for examination. In this case the applicant has 6 months for filing. If a request for examination is not filed within 5 years of earliest priority date or within 6 months of 'direction', the patent application lapses.

### Search

For patent applications that enter national phase without any prior art search or any international examination, a complete search needs to be conducted. For this, as an informal process, a team of 3 examiners is constituted to perform the extensive search. In case of abbreviated examinations, search is not conducted.

### Examination

The purpose of examination is to determine whether the invention meets the statutory requirements for patentability set out in the Patents Act. This examination typically involves an exchange between the examiner and the applicant about the appropriate scope of the specification and the claims in light of the

relevant prior art. At the conclusion of this prosecution the examiner either accepts the application as filed or issues a first report.

### **First Examiner Report**

If an application is not accepted as filed, the examiner issues a first report detailing the procedural and substantive grounds for objecting to the application. The applicant has 21 months to address the objections.<sup>19</sup>

### **Response**

The applicant may file a response to objections raised by the examiner.

### **Further Examination and Reports**

The examiner may issue further reports for each response by the applicant that does not satisfy the objections raised. An application for patent will generally lapse if it is not in order for acceptance within 21 months after the first report. In case a patent application goes to a third round of examinations, an informal procedure is in place to involve a senior examiner to review the report.

### **Results**

There are three final outcomes from prosecution:

- **Acceptance** The claims of the patent application are accepted and there are no objections.
- **Withdrawal** The applicant has chosen to withdraw the claim.
- **Lapse** The patent application has valid objections that have not been overcome by the applicant within the stipulated time.

### **Publication**

The result of the claim is published in Official Journal of Patents and any member of the public can oppose. Any opposition must be filed within 3 months of the publication.

### **Opposition and Hearing**

In case of opposition, a separate group of examiners in OH&L (Opposition Hearing & Legal) conducts the proceedings. At the conclusion of the opposition period or as a result of oppositions and subsequent hearings, the claim can be:

- **Granted** Either when there is no opposition or the opposition claims are rejected.
- **Granted with Amendment** In case of valid opposition the claimant may amend the claim.
- **Refused** In case the applicant is unable to respond to opposition.

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<sup>19</sup> Under the changes to the Patent act in 2013, this has been reduced to 12 months. However as inventory analysis is being conducted for last 15 years, this is not part of the historical analysis.

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