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How has Division 5 (Parental Leave and Related Entitlements) of the Fair Work Act (2009) Affected Fertility Rates in Australia?

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Abstract

One truly global trend, which has been affecting countries around the world for the last three decades, has been the increasing ageing population. Governments and international organizations have sought to address the problems that are caused by an increasing portion of the ageing population. These problems can be substantial, and affect large portions of society, who carry the burden of supporting the ageing population. One of the main measures sought by governments is to increase fertility rates, in order to counter the ageing population and ensure adequate financial sources for supporting the ageing population.

In Australia, the Fair Work Act of 2009 sought to enact various such measures, including introducing minimum standards for all employers, in an attempt to encourage people to have children whilst maintaining economic security. Other such measures introduced by the legislation include mandated minimum unpaid parental leave, and guaranteeing safe jobs for pregnant workers.

The following study seeks to assess the impact of this legislation, and specifically whether the economic incentives it introduced had a positive effect on fertility rates in Australia. In order to assess whether this is the case, the study employs a regression analysis, using fertility rates as the dependent variable, and the Fair Work Act, percentage of Australian population that is female and of childbearing age and average female weekly wages as independent variables. We controlled for variables from a range of studies conducted in the past regarding fertility rates in different countries, and found that the impact of the legislation was not only not significant, but in fact did not result in any positive increase in fertility rates in Australia.

The limitations in the regression analysis, particularly with regard to correlating factors and the limited variables employed, indicate that further analysis may be required, utilizing other longer-term studies. We propose that governments and international organizations continue employing economic incentives in order to encourage having children, as well as utilizing additional incentives and measures to try and increase fertility rates and mitigate the negative effects of an ageing population.

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Policy Question and Purpose of Paper

The world's population is ageing. In virtually every country in the world, the percentage of the population that is made up by older persons is increasing. This phenomenon is termed 'populating ageing'. According to the UN, in 2017 the global population aged 60 years was more than twice as large as in 1980, and the number of older persons is expected to double again by 2050 (UN Department of Economic and Social Affairs, 2017). This is of profound significance, and according to this same study is poised to become one of the most significant social transformations of the twenty-first century. One of the key effects that an ageing population can have is on the economic structure of society. Population ageing reduces labor force participation rates and savings rates, which may lead to a decreasing rate in economic growth (Bloom, Canning, Fink, 2010). At the same time, there is increased need to provide for the ageing population, a burden which often falls on governments, and in turn, to the sector of the population able to pay taxes and provide services.

There are many causes of population ageing, such as advancements in nutrition, education and medical technologies, which lengthen the life expectancy of populations around the world (Sheiner, 2014). This paper will focus on the trend of decreasing fertility rates, which has been noted as one of the main causes for an ageing population (Bongaarts, 1999). Particularly, this paper will examine how efforts by governments to address this trend have impacted on population ageing. The paper will consider the case of Australia, which has enacted legislation to increase parental rights and benefits in an attempt to incentivize people to have more children. Specifically, this paper will examine whether this legislation has been successful in increasing fertility rates, which in turn should slow down population ageing.

Finally, using this examination, this paper will make recommendations for additional or alternative measures to increase fertility rates. These recommendations can be considered and implemented by governments in order to efficiently allocate public resources in an effort to slow down the population ageing and thus reduce the increasing economic burden on governments and the working population.

Background

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Theoretical Background

The economic implications of an ageing population are severe. This is primarily because as a result, less people will be in the labor force but many more will need economic support. Such support is typically provided by governments, through means such as pensions and health systems. In turn, the funding for such means comes from the working sector of the population, through measures such as taxes and direct payments for such services. The impact of an increasing ageing population is not only on the increase in need for services to that population, but also in the reduced output of the state's economy, due to the reduction in population sector which is working. For example, the International Monetary Fund has recently warned that Japan's economy could shrink by over 25% in the next 40 years due to the ageing population (IMF, 2018).

There are a number of steps that governments may take in order to secure sufficient funding to service population ageing, such as raising the retirement age or increasing the level of participation of females in the labor force. Another measure is to attempt to increase fertility rates, which provides both a balance to the ageing population as well as increasing the sector of the population which can contribute in the future towards the payment of taxes and services to an ageing population in the long term.

In order for fertility rates to mitigate population ageing, a defined population needs to achieve, at least, 'replacement level' fertility rates. Replacement level fertility rates is "the level of fertility at which a population exactly replaces itself from one generation to the next" (Winter, 1994). Currently, the United Nations determines that replacement level fertility rates sits at about 2.1 children per woman, which is "the average number of children a woman would need to have to reproduce herself by bearing a daughter who survives to child-bearing age" (WHO, 2019).

In light of this theoretical understanding, we undertook a literature review in order to determine the different effects on fertility rates and the measures that governments and organizations have taken in an attempt to reach replacement level fertility rates.

Literature Review

How has Division 5 (Parental Leave and Related Entitlements) […]?

A review of relevant literature provides that many developed and developing countries are not maintaining 'replacement level' fertility rates at a minimum, which further contributes towards an ageing population. Studies by the World Bank indicate that average fertility rates of different geographic areas are all under replacement level. Thus, the fertility rate for Central Europe and the Baltics stands at 1.5, for East Asia & Pacific it stands at 1.8, for the European Union it stands at 1.6, and for OECD countries as a whole, it stands at 1.7 (World Bank, 2017).

This is not a new phenomenon, and has generally been recognized that most of these countries have not been meeting replacement level fertility rates since the 1970's. Since then, countries and international organizations have taken various steps to try and affect fertility rates and mitigate the effect of an ageing population. For many years, it was generally believed that fertility rates could not be affected positively by offering economic incentives, and that the decision to bear children was not dependent on economic factors. However, studies beginning in the 1970's challenged this assumption, and new theories such as the 'economic theory of the family' provided assessments of different economic models of fertility behavior and demonstrated that fertility rates are affected not only be individual choices but also by economic factors such as the cost of children (Willis, 1973).

As a result of this understanding, governments and organizations seeking to increase fertility rates have also considered various economic measures to try reduce the cost of having children. In the 1970's, for example, the Parliamentary Assembly of the Council of Europe established the Committee for Population Studies in response to the alarming rate of fertility decline in EU countries. The meetings and reports published by this Committee have included assessments and suggestions regarding economic incentives, and have been reviewed in studies reviewing the effect of such measures in individual countries, such as France, Sweden and Germany (Schubnel & McIntosh, 1984).

Fertility rates have continued to decline. A Discussion Paper prepared for the World Bank in 2015 projected that by 2050, the number of people in the workforce for every person older than 64 in the world will be four; this is compared to 1970, when there were 10 people in the workforce for every person over 64 (Bogetic 2015). As a result, this issue has remained high on the agenda of various governments and international organizations. In 2006, for example, a study funded by the Employment and Social Affairs Directorate General of the European

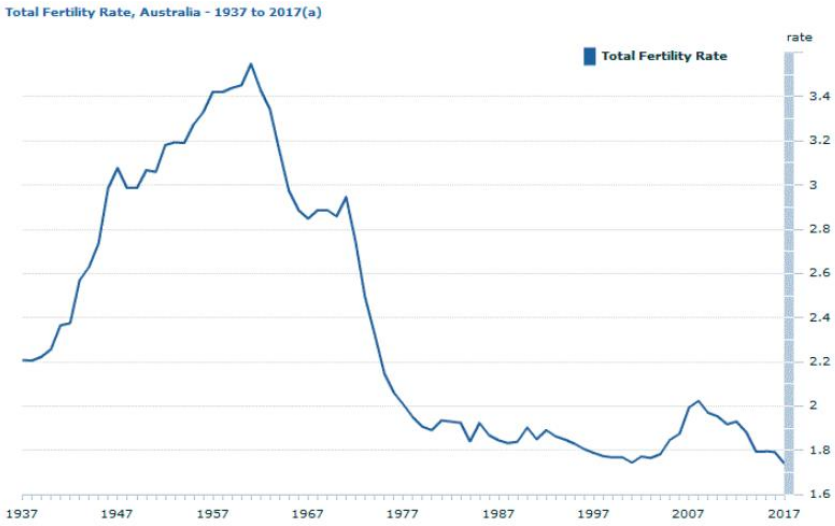
Commission sought to address the problem that an ageing population is causing; namely that an increasing portion of the population receives social benefits while the portion of the population that is responsible for bearing this financial burden is decreasing.

The general understanding of these studies is that there is no concrete or uniform economic measure that will have a certain positive affect on fertility rates, and thus can be relied upon worldwide by governments to reverse the trend of declining replacement levels. Rather, different countries have had different levels of success, with different specific initiatives. Thus, for example, a study of legislative incentives introduced in Poland to provide economic benefits on those having children found that fertility rates stayed the same or increased only slightly over the following decade (Balicki 2001). Gauthier, A. H. & Hatzius, J. (1997) conducted research based on data for 22 industrialized countries, covering the period 1970 to 1990, in order to examine what measures affect fertility rates. While they did not find measures that were 'one-size-fits-all', they did find that measures such as family allowances were significant, and that raising them would raise the fertility rate. Cygan-Rehm, K. (2016) examined a parental leave benefit scheme on higher-order fertility that was implemented in 2007 in Germany in order to raise the fertility rate, and found that it had a small, while not insignificant effect on fertility rates.

Generally, it has been understood that one of the better measures has been with regard to female participation in the workforce, and the conditions granted to people having children while employed. This is because such measures have a dual benefit – firstly, they increase the likelihood that people will have children, and secondly, they increase the percentage of the population in the workforce (which in turn can support additional policies, via taxes and the like). Thus, Grant (2006) notes that two of the most popular policy measures aimed at increasing fertility rates have concerned parental leave and the provision of childcare.

Yet here too, studies have shown that there is not a uniform positive affect on fertility rates as a result of such measures across countries or societies. Grant (2006) reviews a number of individual studies conducted in different countries, some which suggest that increased maternity leave and the provision of additional benefits during such leave have not had a significant impact on fertility rates (Grant et al., 2006, citing Zhang 1994 and Gauthier 1997). Other studies have shown such an affect (Grant et al., 2006, citing studies of Sweden and Hungary (Szabady 1980), the USA (Rindfluss 1996) and Germany (Buttner 1990)).

Fertility rates have also been declining in Australia. There, replacement level fertility rates have not been met or exceeded since 1976. In 1993, for example, the rate stood at 1.82. Since 2000, the rate has varied between 1.7 and 1.9, and today stands at 1.74 (Australian Bureau of Statistics, 2017).



Graph: Total Fertility Rate, Australia 1937 to 2017. (Australian Bureau of Statistics, 2018)

It has been surmised that the fertility rates decline in Australia has been due to two main developments – the availability of oral contraceptives and the increased level of female participation in the workforce (which was affected by increased level of education for females and a changing nature of the workforce); (De Vaus 2002). Organizations in Australia, such as the Australian Institute of Family Studies, have sought to undertake studies in order to better understand fertility decision making amongst individuals, as well as the social, economic and cultural factors that influence this decision making (such as the Household, Income and Labor Dynamics Survey, funded by the Australian Government. This is a household-based panel study that collects information about economic and personal well-being, labour market dynamics and family life (Melbourne Institute, 2018)).

Such studies and information have informed different responses by Australian governments to the problem of declining fertility rates. Most of these efforts have centered around communication efforts to encourage people to have children and to incentivize having children (AIFS, 2019). Such incentivization has focused on regulation that affects the workplace, mothers' rights and child support, in order to increase the financial security to parents who take time off to care for a child. In 1979, for example, Australia introduced

legislation entitling mothers to 52 weeks unpaid maternity leave, rectifying the prior situation which only provided 12 weeks of paid leave to female employees in public service only. Cases brought before different tribunals in the 1980's and 1990's (such as the Industrial Relations Commission) established minimum entitlements for leave and protected women and men against discrimination on family responsibility grounds (AIFS, 2018).

In 2009, the Australian government enacted the Fair Work Act 2009, in an attempt to reform the industrial relations system in Australia. The legislation included various measures that seem designed to increase fertility rates in Australia, whether directly or as a result of other aims (such as increasing gender equality). For example, the Act introduced 'good-faith bargaining', intended to create a bargaining climate between employers and employees more conducive to bargaining for parental leave provisions. The Act also legislates 'equality bargaining', ensuring that groups with common interests are able to collectively bargain for rights and provisions. Colling and Dickens (cited in Baird, Frino & Williamson, 2009) define equality bargaining as encompassing 'the collective negotiation of provisions that are of particular interest or benefit to women'. Naturally, one of the key common interests concern provisions regarding maternity leave and child benefits.

The Act also introduced a number of minimum standards to which employees nationally are to be entitled and which cannot be violated by employers. Some of these standards directly relate to increased benefits for parents or expecting parents in the workplace. For example, the standards determine unpaid parental leave and a return to work guarantee following such leave. It also provides some more industry specific standards, such as the right of pregnant women to be transferred to a safe job if her current position may endanger the pregnancy. The standards also address other issues which can have an impact on those having children or considering having children, such as the right to request flexible working arrangements, compassionate leave, maximum working hours per week and more.

Research Hypothesis

We hypothesize that the Fair Work Act has had a positive effect on fertility rates, but that it will be insufficient to bring these rates to replacement level. This hypothesis is based on reviewing the studies covered in the literature survey, which indicated that governments take various measures – including economic measures, such as parental leave schemes and

financial benefits – in an effort to improve fertility rates. Such efforts have tried to address various aspects which may bring people to have more children. Nevertheless, such efforts have had varied levels of success. As the Fair Work Act addresses a limited number of policy measures, we predict that our regression model will indicate the impact the Fair Work Act will have on fertility rates is noticeable, but not substantial. This will lead to the conclusion that the measures legislated in the Fair Work Act are insufficient to achieve replacement level fertility rates, and that further governmental intervention is required.

Methodology

Data base and the research methods

Fertility rates can be affected by many factors. As noted above, developments in health care, technology and other social elements have increased life expectancy, thus increasing the ageing population. Other societal pressures may impact entire sectors of society as to the expected number of children, child bearing age, and other aspects that affect fertility rates. Thus, when constructing our initial regression, there was a need to find data on a number of variables that we suspected may affect fertility rates in Australia. It was important to identify the different elements that may affect fertility rates in order to control their effects on the fertility rates and help determine what effect the Fair Work Act alone has had on the rates. In our model we are looking at the fertility rates (dependent variable) in Australia between the years 1993-2017 and a number of independent variables that we believe have an effect on fertility rates.

We collected the majority of our data from records containing statistics compiled and provided by the Australian government. Particularly, we turned to the Australian Institute of Health and Welfare and the Australian Bureau of Statistics to find most of the data on our regression variables. This was in order to ensure that we were using the most reliable and most accurate data available, as these government agencies have both the requisite resources and the requisite legislative authorities to obtain the most relevant and widespread data. Further, by using official sources such as these, we will be able to make more authoritative recommendations to governments worldwide based on the research findings. In addition to these national sources, we also used data and information compiled and published by international organizations. Particularly, we used information provided by the World Bank,

the World Health Organization and the United Nations, in order to complete information about population numbers and ages.

It should be noted that where there were missing values for certain years, we used the mean number of the year before and after.

We use *Stata* as a means for our Ordinary Least Square (OLS) regression analysis. First, we conduct qualitative analysis of our data. Second, we run our regression model according to initial variables we decided to include in our regression that we believe could have a potential impact on fertility rates. Third, we conduct regression diagnostics and significant tests of our variables. Fourth, we optimize the model by checking for correlation between variables and general levels of variable significance. We then remove the variables that prevent us from obtaining an accurate and clear picture of the effect the Fair Work Act has had on fertility rates.

The initial OLS regression model is outlined as follows and explained in *Table 1*:

Model A)

$$Y(fertility) = \beta 0 + \alpha 1FWA + \beta 2mmor + \beta 3popc + \beta 4marr + \beta 5feduc + \beta 6fwage + e$$

Dependent Variable and Independent Variables

In our study, we analyze the influence of the independent variables on the dependent variable, the fertility rates in Australia. The data for the dependent variable is retrieved from the Australian Bureau of Statistics, latest updated in 2018. The variable accounts for the average number of children a woman will have in her lifetime according to the statistics of the current period. Our primary independent variable, the Fair Work Act, is represented as a dummy variable that serves to indicate the years before and after the Fair Work Act (the Act was enacted in 2009).

Control Variables

How has Division 5 (Parental Leave and Related Entitlements) […]?

To reduce the error term *e*, it is important to determine variables that could influence the fertility rate apart from our independent variable, the Fair Work Act. Based on past research we control for maternal mortality ratio, percentage of population that is of child-bearing age, crude marriage rates, average female years of education, and average female weekly wage. The control variables are defined in *Table 1*.

Table 1

Definition and explanation of the regression variables

Variable	**Explanation**	**Measure**	**Source**
FRate	Fertility rates in Australia	Average number of children a woman has in her lifetime	Australian Bureau of Statistics
FWA	Fair Work Act	Enactment of the Fair Work Act	Australian Federal Register of Legislation
MMR	Maternal Mortality Rate	Number of direct and indirect maternal deaths divided by the number of women who gave birth	Australian Institute of Health and Welfare
PopC	Percentage of Population that is of childbearing age	Woman between the age of 14-49 were compared to the corresponding female population at the time	World Bank Open Data
CrudeM	Crude Marriage Rate	Number of marriages per 1,000 of estimated resident population of each reference year	Australian Institute of Family Studies
Feduc	Average female years of education in Australia	Average number of years of education received by people ages 25 and older, converted form educational attainment levels using official duration of each level.	United Nations Development Programme
FWW	Average female weekly wage in Australia	Level of average earnings in Australia at a certain point in time	Australian Bureau of Statistics

The variables in the regression were chosen due to the impact they are believed to have on fertility rates.

It is clear that the likelihood of a mother dying in childbirth is a relevant factor in deciding whether to have children (a study by Trussel & Pebley, 1994, for example, found that this likelihood is statistically significant with relation to fertility rates). Thus, it is important to take into consideration the maternal mortality ratio.

How has Division 5 (Parental Leave and Related Entitlements) […]?

The percentage of the population that is of childbearing age was constructed from reviewing population estimates and projections. The percentage was created by comparing the number of women between the ages of 15 and 49 to the entire female population in Australia at the corresponding time period (that is, each year). This data was vital in order to obtain a clear and unbiased view of fertility rates. For example, if the *PopC* (Percentage of Population that is of childbearing age) is low, then even if the fertility rates in the corresponding period were high, the results would still show a relatively low number of births. This variable appears heavily in other studies of the same issue; such as Bongaarts (1999).

It is also clear that in modern society, marriage remains an important and common institution, and that people are more likely to have children once they are married. Thus, crude marriage rates help capture the effects that marriage can have on fertility rates (indeed, the Australian Institute of Family Studies has noted that "most long-run changes in fertility can be accounted for by changes in the marital composition of society." – (Stone, 2018)).

It has been noted that the higher the level of education a woman receives, the lower the fertility rate (Bloom et al., 2010, which found that the data displayed show a correlation of –0.85 between total years of schooling and contemporaneous fertility rates; on average, each unit drop in the total fertility rate is roughly associated with a 1.1-year increase in average years of schooling). This negative correlation has been strongly observed, and thus the average female education years is another relevant variable.

As noted above in the literature review, one of the key factors in deciding whether to have children is economic. Thus, the average female weekly wage must be included in the regression. This is particularly so as female participation in the workforce has increased dramatically over the last few decades. This has been noted to impact fertility rates. For example, Yashiro, 1998 found that "A major cause of this continuous decline [in fertility rates] is the increasing participation of women in the labor force. This, in turn, increases the opportunity costs of having children for a family" (Yashiro, 1998).

The regression is time series (yearly) and all the variable data is taken yearly. The regression looks at a period of 16 years before the Fair Work Act was properly implemented (that is, 1993 until 2009) and a nine-year period after the Act was implemented (2009 until 2017).

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Data Analysis

Descriptive Statistics

Table 2

Descriptive Statistics of Model A)

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Year	25	2005	7.359801	1993	2017
FRate	25	1.82488	0.0722169	1.729	1.994
FWA	25	0.36	0.4898979	0	1
MMR	25	7.28	1.021437	6	9
PopC	25	0.4985164	0.0167033	0.4698472	0.5266166
CrudeM	25	5.525	0.4356405	4.6	6.4
Feduc	25	11.838	0.7114069	11	12.9
FWW	24	662.1083	176.9743	425.6	946.8

We analyzed the descriptive statistics of our data and found the following results summarized in *Table 2*. When looking at the fertility rates, we can see that there have not been dramatic fluctuations over during the time period (min=1.729, max=1.994, SD= 0.0860114) we are analyzing. In fact, even after the Fair Work Act was introduced in 2009, the fertility rate continued to fluctuate and decrease. In 2007, before the Fair Work Act was introduced, the fertility rate reached its highest recorded level during the defined period of 1.994. In 2009, the *FRate*=1.9 (the year the Fair Work Act was announced). Following 2009, the rate began to decrease.

This could indicate that the implementation of the Fair Work Act did not have an effect on the fertility rate at all. The *PopC* (population of childbearing age) showed that the percentage was steadily decreasing during the period (Min=0 .4698472, max= 0 .5266166, SD=0.0167033). The average female weekly wage showed a constant increase over time (min=425.6, max=946.8, SD=176.9743).

Regression Diagnostics

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We then ran an OLS time series regression with our initial control variables specified in *Table 1*. While regressing the model we found all the variables were insignificant at a 95% confidence interval; see *Table 3*. The insignificance remained even after removing outliers from the fertility rates. We suspect that the reason for these results was that all our variables were extremely correlated. Therefore, their impacts on the dependent variable were exaggerated or offset by the other variables in the regression.

The correlations that we found, and their explanations, are as follows:

1. Crude marriage rates are highly negatively correlated with female education *(Corr = -0.8449)*. As people invest more time and resources into their continuing education, the importance of marriage, especially at an earlier age, decreases. This has been termed by some as 'waithood', which is explained as "the greater participation of women in the labor force and education, changing gender norms, or globalization" which has all had the effect of delaying marriage (Singerman, 2008).

2. Maternal mortality rates and crude marriage rates *(Corr = 0.7784)* are positively correlated. This indicates that the more women who are married, the more pregnancies occur, and consequently, more maternal deaths.

3. Maternal mortality rates and average female education *(Corr = -0.8868)* are highly negatively correlated. As noted above, education and marriage are negatively correlated, thus it is reasonable that maternal deaths and education hold the same relationship.

4. Maternal mortality rate and the percentage of population that is of childbearing age *(Corr = 0.8515)* are positively correlated. This too is a logical correlation, as the more women to give birth, the higher the number of maternal deaths occur.

5. Maternal mortality rate and average female weekly wage *(Corr = -0.9065)* are highly negatively correlated. The higher a woman's salary, the greater the opportunity cost of a child, as she is forfeiting her salary (or part thereof) during maternity leave.

6. Population of child bearing age is strongly positively correlated with crude marriage rates *(Corr = 0.9372).* This again is a logical correlation; as the percentage of the population that is of childbearing age increases, the marriage rate will increase as well.

7. Crude marriage rates and female weekly wages are negatively correlated *(Corr = -0.8969).* As wages increase, people are more able to support themselves independently and thus less likely to seek marriage for reasons of economic dependence. This in turn may reduce the number of marriages in total.

8. Female education and female weekly wage are strongly and positively correlated *(Corr = 0.9779).* This connection is a known and clear one, as the more a person (in this case women) educate themselves, the higher their value to the workforce and therefore the higher the wages they will be able to demand.

We also identified some correlations that did not have obvious explanations. Specifically, population of childbearing age and female education are highly negatively correlated *(Corr = -0.9326).* It is suggested that further studies assess this correlation in an attempt to ascertain its importance on fertility rates. For example, the long-term effects of female education could have an inter-generational impact on the number of female births, and thus on the population percentage of childbearing age. A longer term study would be required to assess this. Likewise, population of childbearing age and female weekly wages are also negatively correlated *(Corr = -0.9783).* This connection is also not very clear, as one may assume that the ages of a population (whether or not they are in their childbearing period) should not be impacted by wages. This, too, would require a longer term study, to assess, for example, whether perhaps having more women of childbearing age in the workforce increases their bargaining power and thus results in higher wages.

Table 3

Regression results of Model A)

Variable	**Coef.**	**P>|t|**
FWA	-0.1494003	0.047

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MMR	0.0038339	0.919
PopC	8.282882	0.514
CrudeM	0.1126584	0.449
Feduc	-0.0169104	0.861
FWW	0.0028056	0.149
_cons	-3.863434	0.538

After checking multiple regressions and testing different variables in log form, we settled on a new form of our regression (Model B). The new regression removed the above correlated variables, and remained with three independent variables. In this regression we have included *FRate* (dependent variable measuring annual fertility rates), *FWA* (dummy variable to capture implementation of the Fair Work Act), *PopC* (independent variable that accounts for percentage of population that is of childbearing age) and *FWW* (independent variable that captures the effect of female weekly wage).

Model B)

$$Y(fertility) = \beta 0 + \alpha 1 FWA + \beta 2 popc + \beta 3 FWW + e$$

After regressing in *stata*, the variables were observed as significant at a 95% confidence interval, with the exception of the Fair Work Act that is significant at a 90% confidence interval; see *Table 4*.

The *R squared* for Model B is 0.7774, meaning that 77.75% of the variance for the dependent variable (fertility rates) is explained by the independent variables. The remaining 22.26 % is present in the error term. In contrast, the R squared in our previous regression was 0.7791. Thus, despite removing three variables from the regression, our *R squared* was reduced by only 0.17%. This reiterates the lack of explanatory value in the three variables removed, due to their collinearity and lack of statistical significance.

Table 4

Regression results of Model B)

How has Division 5 (Parental Leave and Related Entitlements) […]?

Variable	Coef.	P>|t|
FWA	-0.1528079	0.013
Popc	14.95118	0.061
FWW	0.00260602	0.006
_cons	-6.88796	0.109

Results and Conclusions

As noted above, in the years following the implementation of the Fair Work Act, the fertility rates in Australia did not increase (and certainly did not reach replacement levels). Indeed, they decreased.

Thus, it is clear that the Fair Work Act did not have the effect of giving a net increase in the fertility rates. In order to determine whether this was because the Fair Work Act had no (or negative) impact itself, or whether the negative impact of other variables outweighed the positive impact of the Fair Work Act, we need to examine our regression. According to the regression, the population of childbearing age was steadily decreasing after the implementation of the Fair Work Act. At the same time, the female weekly wage was steadily increasing.

In our regression, we have three independent variables; Fair Work Act, Population of childbearing age and Female Weekly Wage. These three variables affect the dependent variable (fertility rates) in different ways.

1. The Fair Work Act: The coefficient ($\boldsymbol{\beta}$=) is -0.1528079. This indicates that the Fair Work Act has resulted in the fertility rates falling 0.15% lower. Thus, it appears that the Fair Work Act has been not only ineffective in raising fertility rates, but has actually had a negative impact on the issue of an ageing population.

2. The Population of Childbearing Age: The coefficient for this is 14.95118, which is a significant value for a coefficient, especially in comparison to the other two coefficients. Out of all the variables in our equation, it appears that the population of childbearing age is having the biggest effect on fertility rates. For every 1% increase in the population of childbearing age, there is a 14% increase in fertility rates.

3. Female Weekly Wage: This is a positive coefficient of 0.00261, meaning that as female weekly wage increases, so do fertility rates. This is not in line with our hypothesis, as we believed that the greater the opportunity cost of a child, the less women will be inclined to give birth. However, the coefficient is a small number, thus, whilst the female weekly wage is statistically significant, the effect that it has on fertility rates is somewhat insignificant. For every 1% increase in women's wages, fertility increases by 0.00261%. Perhaps this could be explained by the fact that the negative impact of the increase in the opportunity costs of having a baby is mitigated by parents being confident that they can support a baby financially.

Our hypothesis was based on the fact that various studies in the past few decades have confirmed that economic factors impact the decision to have children, and thus have a role to play in affecting fertility rates. Thus, it is important to assess how economic incentives by governments to have children have impacted fertility rates, over and above campaigns by governments to increase fertility rates by appealing to issues such as family happiness. However, these studies also indicated that economic incentives introduced by governments have not had long-term positive effects on fertility rates, and have generally only resulted in small, short-term impact.

However, our hypothesis did not prove to be correct, and it seems that the Fair Work Act on its own did not have a positive impact on fertility rates. This could be for a number of reasons. One reason could simply be that the government did not sufficiently work to communicate the benefits offered by the Fair Work Act, and people considering having children are insufficiently aware of the rights and benefits offered by the Fair Work Act which were unavailable before it was introduced.

Another reason could be that as the female weekly wage rises, the opportunity cost of having children also rises, and the economic incentives offered by the Fair Work Act do not outweigh this rising opportunity cost. Thus, people are being incentivized with benefits that do not meet their needs or demands.

Additionally, one could consider the impact that changing social norms may have on the perception of the Fair Work Act incentives. While measures aimed at job security and

assured leave are positive measures, they may be insufficient for the younger generation, which seeks different incentives when considering the impact having children may have on their job careers. Thus, for example, the fact that unpaid parental leave is only guaranteed to people who have been employed for 12 months or more at a place of work may not be suited to the current workforce, in which individuals move from workplace to workplace at a much higher rate than in the past (Munasinghe, 2000).

It should be noted, however, that there are a number of limitations regarding the regressions used above. Particularly, there are other variables which may be relevant in determining what affect the measures introduced by the Fair Work Act have had. For example, one could consider what effect religion in Australia has had on fertility rates over time. Studies and consensus surveys have shown that while in the 1980's, approximately 10% of the population identified as holding no religion, in 2016 that number had jumped to approximately 30% of the population (Australian Bureau of Statistics, 2016). Unfortunately, accurate yearly data on the religious population appears to be lacking, nor was there a sufficient proxy variable that could have been employed, so it was left out of the regression. Suggestions for further research include conducting surveys considering the relationship between religion and fertility rates in Australia.

Another limitation concerns the variable representing crude marriage rates. As noted above, as crude marriage rates decrease, so do fertility rates. The variable representing crude marriage rates was excluded from the regression due to statistical insignificance in many variations of the regression and collinearity to other independent variables. Data for crude marriage rates is available, and it indicates that the rate a was decreasing consistently throughout the period of our analysis (specifically, it started at 6.4 in 1993, and stood at 4.6 in 2017 (Australian Institute of Health and Welfare, 2018)). We also know that female education has a negative effect on fertility rates, that is, as women are more educated, the fewer children they will have. This was also excluded from the regression because of statistical insignificance and collinearity. We also have statistics for average female weekly wage, and it constantly increased during the period reviewed (1993 =11, 2017 =12.9 (Australian Bureau of Statistics)). From our literature review, we know that these two variables decrease fertility rates. Unfortunately, we cannot place a numeric value on their effect on fertility rates, or to what extent they thwarted the results of our regression. For future economic analysis on this topic, we suggest including variables that account for the

effect of education and marriage rates on fertility rates but do not pose an issue of collinearity.

Policy Recommendations

It is clear that an ageing population will remain a vital issue for modern society, especially in Western countries. As long as fertility rates do not meet replacement levels, governments and international organizations will continue to try and find ways of mitigating the negative effect on the economic structure of society. Particularly, measures will be sought to try and alleviate the increasing costs of an ageing population, and to reduce the increased pressures on the working age population who are mostly burdened with this cost.

Based on the review and regressions conducted above, the following are a number of policy proposals which could be reviewed by governments and international organizations.

Economic Incentives for Having Children

While the regression resulted in a disproval of the hypothesis, it still appears to be an accepted understanding that economic factors influence the decision whether to have children (Willis, 1973). Thus, governments and international organizations should continue to enact economic incentives in order to increase the fertility rates and mitigate the effects of an ageing population.

Such incentives should continue to focus on measures that make it easier for females in the workplace to financially support having children, as well as reducing the impact such a decision may have on their careers. This would sufficiently take into account changing social norms, as a result of which there is increased opportunity for females in the workplace, and increased levels of female education, which in turn also leads to increased female participation in the workforce (McClamroch, 1996).

Such measures could concern increased unpaid parental leave; mandated paid parental leave; one-off payments at childbirth; increased guaranteed job security for those taking parental leave; and more. As noted above, such measures have a double benefit. First, they increase the fertility rates, and second, they increase the level of female participation in the workforce,

which in turn increase measures such as taxes, which allow governments to increase their financial support of measures mitigating the ageing population.

Importantly, governments need to ensure that these economic incentives are aligned with both the developments in the economic situation of parents or would-be parents, as well as evolving social norms. If governments introduce incentives which do not outweigh the economic cost of having children, they will be ineffective. Likewise, if governments introduce incentives that do not answer the social interests or demands of the childbearing age population, they will be ineffective.

Nevertheless, due to the fact that the regression indicates that the economic benefits provided by the Fair Work Act did not have a substantial impact on fertility rates, governments and international organizations must consider additional measures and incentives. Some options are below.

Communication Efforts to Encourage Having Children

As noted above, despite the understanding that economic incentives are a factor in deciding whether to give birth, the introduction of the Fair Work Act (and the incentives included within it) did lead to a positive impact on fertility rates in Australia. One explanation for this could be that the relevant population was insufficiently aware of the benefits offered by the Fair Work Act.

Thus, governments should make efforts to ensure that the economic measures they introduce are well communicated to the childbearing age population, in order to ensure that they are well understood and recognized. This includes not only informing them of the new incentives, but also ensuring that they have sufficient information in order to weigh up those incentives with the current costs of having children.

Immigration

As noted above, the results of the regression indicated that an increased in the portion of the population of childbearing age had a significant effect on the fertility rates. Thus, governments should consider increasing the rate of immigration of females of childbearing

age, and provide them with incentives to giving birth in their new country (such as automatic right to citizenship, education and social services). While immigration generally has been a measure adopted by different countries in order to increase the portion of the population that can participate in the workforce (Furtado & Hock, 2010), governments could consider more direct immigration policies aimed at females of childbearing age.

Raising Retirement Age

Finally, governments could consider raising the retirement age, and thus increase the portion of the population which is in the workforce, providing increased finances for governments to use to provide services to the ageing population. This measure would not have an impact on fertility rates, but could be an interim measure used to obtain more funds with which to support an ageing population. (Battistin, et al. 2007)

How has Division 5 (Parental Leave and Related Entitlements) […]?

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