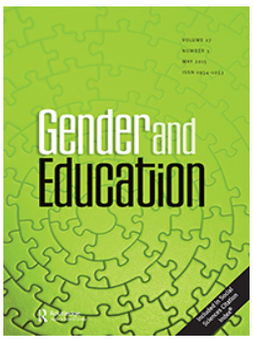

Gender and Education

ISSN: 0954-0253 (Print) 1360-0516 (Online) Journal homepage: http://www.tandfonline.com/loi/cgee20

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To cite this article: Sarah Jane Aiston & Jisun Jung (2015) Women academics and research productivity: an international comparison, Gender and Education, 27:3, 205-220, DOI: 10.1080/09540253.2015.1024617

To link to this article: http://dx.doi.org/10.1080/09540253.2015.1024617

Gender and Education, 2015
Vol. 27, No. 3, 205–220, http://dx.doi.org/10.1080/09540253.2015.1024617

Women academics and research productivity: an international comparison

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(*Received 13 August 2014; accepted 26 February 2015*)

In the prestige economy of higher education, research productivity is highly prized. Previous research indicates, however, a gender gap with respect to research output. This gap is often explained by reference to familial status and responsibilities. In this article, we examine the research productivity gender gap from an international perspective by undertaking a gendered analysis of the Changing Academic Profession Survey. We suggest that family is not, in all cases, operating as a form of negative equity in the prestige economy of higher education. In addition, we argue that an over-reliance on an explanatory framework that positions family-related variables as central to the research productivity gender gap might well be drawing our attention from significant structural and systemic discriminatory practices within the profession.

Keywords: women; academics; research; productivity; family

Introduction

Research related to the position, status and experience of women academics has increasingly attracted the attention of scholars in recent decades. Despite the increase in the numbers of women entering higher education as undergraduate students internationally (although this trend is far from universal[1]), women continue to fail to progress through the academic hierarchy in significant numbers and enter senior leadership positions. In 2012, in response to this situation, academics put forward a manifesto for change to increase women's participation in higher education leadership and research globally.[2]

How and why the academic gender gap is maintained is both complex and multifaceted. The organisational culture and structures of the academy are regarded as both perpetuating and privileging masculine practices and norms (Husu and Morley 2000; Thomas and Davies 2002; Bailyn 2003; Harley 2003; Ozkanli et al. 2009). Academic gate-keeping, the process of selection, coupled with the allocation of resources, works to the disadvantage of academic women; either slowing down their career progression, or excluding them from the higher echelons of the academy (Husu 2004). The effectiveness of 'transparency' and 'accountability' measures in recruitment and promotion decisions is questioned (Van den Brink, Benschop, and Jansen 2010) and gender stereotyping in turn influences the roles academic women do undertake, positioning them as caretakers (Turner 2002; Schein 2007) or 'academic mommies'

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(Ropes-Huilman 2000). Their work is different from their male colleagues and is generally viewed as unequal. Academic women are more likely to be heavily involved in pastoral care, committee work (but not necessarily decision-making bodies), teaching and the corresponding quality assurance and audit processes (Kjeldal, Rindfleish, and Sheridan 2006; Hughes et al. 2007; Morley 2007). Leadership is implicitly constructed as male (Madera, Hebel, and Martin 2009; Fitzgerald 2014) and a lack of mentors and networks further marginalises academic women (Baldwin 1985; Clark and Corcoran 1986; O'Leary and Mitchell 1990). And in the 'greedy' academy, women academics, in particular, face the challenge of how to negotiate work and family (Bailyn 2003; Probert 2005).

The aim of this article is to further contribute to our understanding of the academic gender gap from an international perspective. What factors or forces prevent women academics leading, rather than being led, within the academy? At this point the conceptual framework of the prestige economy is highly relevant, namely what is valued or prized most highly in higher education? (Blackmore 2012). What counts for, and what will gain, academic promotion? Answer: Research (Skelton 2005; Abreu et al. 2008; Postiglione and Wang 2009; Baker 2012; Macfarlane 2012; Fitzgerald 2014). As Morley notes, 'research performance is implicitly associated with the prestige economy in higher education, and is a pathway to academic seniority and indicator for promotion' (Morley 2014, 116).

In a comparative study, such as the one undertaken in this article, we may well ask, is the prestige economy universal in its application? One indication that a discourse of research excellence is dominant, particularly with respect to mature higher education systems in the developed world, is the increasing importance of global rankings; rankings that favour research-intensive universities (De Witte and Hudrlikova 2013). More specifically, the ranking organisations assess the research productivity of universities through statistics that aggregate quality and quantity of faculty publications (Hallinger 2014). The emphasis on international standing and the performativity audit culture of contemporary higher education demand tangible, measurable research outputs with an emphasis on both the quality and the quantity of academic publications (Baker 2012). Whilst partly initiated by Western new managerial-orientated doctrines and neo-liberalist ideologies, higher education institutions in Asia are also increasingly under pressure to compete internationally, particularly in measuring research performance and allocating performance-based funding (Deem, Mok, and Lucas 2008; Hallinger 2014). Take, for example, Korea's publish or perish culture (Lee and Lee 2013) or the introduction of the Research Assessment Exercise in Hong Kong (Postiglione and Wang 2009). Previous research confirms the gender gap in research productivity; women academics publish less on average than their male colleagues (Tower et al. 2007). The consequence of this gender gap in the prestige economy of higher education is highly significant in a promotion system that often favours research over teaching and service (Baker 2012).

The aim of this article is to further explore the issue of gender and research productivity from an international perspective, by undertaking an analysis of the Changing Academic Profession (CAP) survey data, with a focus on publications. There are a number of indicators to measure research productivity – number of publications, citation counts, doctoral students and competitive research funding (Litwin 2012), although there are differences between academic disciplines in terms of the importance attributed to these indicators (Becher and Trowler 2001). Nevertheless, the number of publications, particularly peer-reviewed journal articles, is the most widely used

indicator of research productivity *across* academic disciplines (Toutkoushian and Bellas 2003; Horta, Dautel, and Veloso 2012; Shin et al. 2014) since it is the most important stimulant of career progression and also allows for comparative analysis (Litwin 2012).

The CAP survey

The CAP survey is an international survey that was conducted in 1992 and 2008. The most recent survey included 19 countries and is a 16-page closed questionnaire which contains items related to, for example, educational background, conditions of employment, academic role, university management and personal context. The survey, albeit not intentionally designed to consider the position of women as academics, can provide a large-scale insight into the working lives of academics, both men and women, internationally. To date, there have been few published studies that present specifically a gendered analysis of this survey; Bain and Cummings (2000) discuss the academy's glass ceiling in relation to the 1992 survey, whilst Aiston (2014) considers the situation of women academics in Hong Kong with respect to the 2008 data. The advantages of carrying out a gendered re-analysis of this survey data are threefold. First, it provides the opportunity to explore comparatively the position of both men and women, thereby highlighting the extent to which the academy is gendered. Second, it enables an analysis of the position of women academics at a macro level in which we can observe large-scale trends. This provides an interesting comparison with respect to research that has largely drawn on interview data to uncover women's experiences (a point we will return to). Third, given the international dimension of the survey, we can also explore both the shared and divergent aspects of academic women's positions.

Five countries were selected for analysis on the basis of the following criteria. First, we considered the proportion of women academics in different countries, based on the Global Gender Index (Times Higher Education 2013). We selected a number of countries that varied with respect to the proportion of women academics and considered the representativeness of the CAP survey data compared to the proportion of women academics in each of these countries. Through this comparison, we narrowed down the scope of analysis to five countries: Japan, Hong Kong, Germany, the USA, and Finland. Table 1 shows the comparison between the Global Gender Index and the sample distribution of the CAP survey. Second, each of these five countries are economically advanced, with mature higher education systems, but also represent different forms of systems, for example, professional (Germany and Finland), market (the USA and Hong Kong) and state orientated (Japan) (Clark 1983; Shin and Harman 2009). In addition, each of these systems has different shapes of academic hierarchies (Bain and Cummings 2000). Finally, these five countries represent interesting different contexts with respect to the position and status of women in society in general. Finland, Germany and the USA rank relatively highly on a number of indicators with respect to gender equality – 2nd, 14th and 23rd, respectively (World Economic Forum 2013). By contrast, however, Japan is ranked 105th out of the 136 countries listed in the Global Gender Gap report. Hong Kong is not included in this report, however, culturally (as is the case with Japanese society), a premium is placed on women's role in society as wives, mothers and homemakers (Luke 2000).

Before moving on to consider the issue of gender and research productivity, Tables 2 and 3 present the rank and discipline composition of the sample. Across each of the five countries men outnumber women in both senior and junior academic

Table 1. Percentage (%) of women academics.

	Global index (%)	CAP (%)
Australia	40–45	57
Finland	**40–45**	**45**
Canada	35–40	34
USA	**35–40**	**38**
Hong Kong	**30–35**	**35**
Norway	30–35	40
UK	30–35	46
Netherlands	30–35	40
Germany	**30–35**	**33**
Italy	30–35	32
China	<25	37
Japan	**<25**	**17**
Korea	No data available	18

Note: Global index: Times Higher Education (2013), http://www.timeshighereducation.co.uk/story.aspx?storyCode=2003517

Table 2. Gender and rank.

	Finland		Germany		Hong Kong		Japan		USA	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Senior	245 (65.0)	132 (35.0)	374 (80.8)	89 (19.2)	288 (79.1)	76 (20.9)	1109 (91.6)	102 (8.4)	451 (62.6)	270 (37.4)
Junior	438 (44.0)	557 (56.0)	438 (64.8)	238 (35.2)	238 (56.9)	180 (43.1)	155 (87.1)	23 (12.9)	209 (50.5)	205 (49.5)
Total	683 (49.8)	689 (50.2)	812 (71.3)	327 (28.7)	526 (67.3)	256 (32.7)	1264 (91.0)	125 (9.0)	660 (58.1)	475 (41.9)

Table 3. Gender and discipline.

	Finland		Germany		Hong Kong		Japan		USA	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Humanities/ social science	207 (42.6)	279 (57.4)	214 (62.9)	126 (37.1)	287 (63.9)	162 (36.1)	321 (83.6)	63 (16.4)	343 (54.6)	285 (45.4)
Science/ engineering	301 (60.2)	199 (39.8)	527 (77.2)	156 (22.8)	198 (75.3)	65 (24.7)	801 (95.5)	38 (4.5)	268 (65.2)	143 (34.8)
Total	508 (51.50	478 (48.5)	741 (72.4)	282 (27.6)	485 (68.1)	227 (31.9)	1122 (91.7)	101 (8.3)	611 (58.8)	428 (41.2)

positions, with the exception of Finland at the junior level. As we can see, the gender gap is comparatively less significant amongst junior staff. However, what is striking is the small number of Japanese female academics at either level (see Table 2).[3]

With respect to the disciplinary composition of the sample (see Table 3),[4] unsurprisingly, the proportion of male academics in science and engineering is higher than that of female academics. This gap is particularly significant in the case of Japan, whereby 95% of male respondents indicated that they were in the science and engineering disciplines as apposed to only 5% of females. In Finland, this disciplinary gap is less significant with approximately 40%of female academics in science and engineering. Within this sample, women have higher representation in the humanities and social sciences.

Gender and research productivity

The CAP survey provides information on the number of scholarly contributions academics completed over a three-year period. Xie and Shauman (1998), in considering the extent to which self-reported number of publications is a valid measure of productivity, concluded that whilst we might acknowledge potential inaccuracies, consistency across multiple surveys suggests that this is an appropriate approach. The most significant output in the CAP survey, within a three-year period, is book chapters and journal articles (which are conflated into one item). Unfortunately, we have no indication of the status (e.g. peer-reviewed) or quality of these outputs, but nevertheless these data provide a significant insight into the issue of gender and research productivity.

As Table 4 shows, women academics on average published less over a three-year period. This gap in research output is particularly an issue for Asian women academics and strikingly so for Japanese female academics. By contrast, the discrepancy between male and female academics in the USA is marginal.

On further analysis by gender, rank and number of articles (see Table 5), we can see, particularly in the context of Germany, Finland and the USA, a more noticeable gap in output between senior male and female academics, as compared to the position of junior academics in those countries. How might we explain this? One hypothesis we might put forward is that these senior academic women are at a point in their lives when they have caring responsibilities – be it either childcare or care for elderly parents – which impact on their research output. For now, however, let us 'park' that thought.

When we go on to consider gender, discipline and number of articles (see Table 6), it is not surprising to see that women academics in engineering and the natural sciences fare less favourably in terms of their research output. Numerous studies have found that women publish at lower rates than men in the sciences (Kyvik 1990; Xie and Shauman 1998, Sax et al. 2002). This is statistically significant in all countries, except the USA. What is surprising, however, is that female academics in the humanities and social sciences in Germany, Finland and Hong Kong publish significantly less then male colleagues in the same field.

Table 4. Gender and number of book chapters and articles.

	Male	Female
Germany	9.20	7.77
Finland	6.88	5.37
Hong Kong	9.69	7.36
Japan	8.56	3.60
USA	4.35	3.48

Table 5. Gender, rank and number of book chapters and articles.

	Senior		Junior	
	Male	Female	Male	Female
Germany	12.58	10.38	5.81	5.16
Finland	10.0	7.52	3.75	3.22
Hong Kong	12.91	10.74	6.47	3.97
Japan	10.08	4.60	7.03	2.59
USA	5.60	4.15	3.09	2.80

Table 6. Gender, discipline and number of book chapters and articles.

	Humanities/social science			Engineering/natural science		
	Male	Female	*F* (sig.)	Male	Female	*F* (sig.)
Finland	5.36	4.14	7.739**	6.69	4.98	7.071**
Germany	10.07	6.84	3.974*	8.29	6.28	12.067***
Hong Kong	6.43	4.61	9.462**	16.69	12.15	2.702*
Japan	4.22	2.95	1.187	11.50	5.10	9.396**
USA	3.39	2.85	1.543	6.67	5.48	0.283

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Research productivity: the gender gap

So far we have established within the context of this data that there is a gender gap with respect to research output. But the question then becomes what can account for this difference in research productivity? Previous research has attempted to explain this difference by placing a focus on family-related variables, particularly marriage and children (Sax et al. 2002). Family is seen as having a significant influence on academic women's career development, creating constraints and demands as they struggle and sacrifice more than men with respect to parenting and housework and negotiate the contradictory discourse of successful academic and good mother (Bhalalusesa 1998; Raddon 2010; Beddoes and Pawley 2013). It is a sacrifice which, research has indicated, leads to less investment in research, thereby impacting on research productivity (Bailyn 2003; Jons 2011; Beddoes and Pawley 2013).

Let us consider these variables within the context of this survey data. As Table 7 shows academic women overall are less likely to be married in comparison to their male colleagues (this finding supports previous research; see Baker 2012). In Germany and Finland, the marriage rate between male and female academics is marginal; however, in Hong Kong, the USA and particularly Japan this difference is more marked. Japanese male academics are twice as likely to be married than their female counterparts.

If we now consider our first family-related variable – marriage/partner – in terms of research output what do we find? Married academic women are *more* productive than single academic women on average. This is statistically significant in the case of Hong Kong and, even more so, for Finnish female academics. Marriage is not operating as a form of negative equity with respect to research productivity. As we can also see,

Table 7. Gender and marital status (%).

	Male	Female
Germany		
Married/partner	90.0	83.1
Single	10.0	16.9
Finland		
Married/partner	83.0	80.6
Single	13.6	13.8
Hong Kong		
Married/partner	83.5	65.5
Single	14.2	32.6
Japan		
Married/partner	91.7	52.8
Single	7.8	45.5
USA		
Married/partner	85.3	66.9
Single	7.3	13.7

marriage, or being in a partnership, also correlates positively with research productivity for academic men, and is statistically significant for Finnish, German and particularly Japanese male academics (Table 8).

The CAP survey also asks respondents to indicate if they had ever interrupted their employment in order to provide child or elderly care in the home (second family-related variable), along with if they have any children living with them (third family-related variable). As we might expect, academic women are far more likely to interrupt their academic careers to take up caring responsibilities (see Table 9). Finnish academic women and also Finnish academic men were most likely to have taken a career break. This is not surprising given the relatively high level of support provided by the Finnish state.[5]

So, of those academic women who have taken a career break, how has this affected their research output? Intuitively, and based on our knowledge, to some extent, of previous research, we would expect to see that women who have had a break in their careers would be less productive. However, as we can see (Table 10), these women, with the exception of women academics in Hong Kong, are *more* productive than those who have not taken a career break on average. The *t*-test shows that this is statistically significant in the case of Finnish and Japanese academic women.

On further analysis by discipline, female academics in the humanities and social sciences in Hong Kong and Japan who had taken career breaks were less productive than those women who had not taken career breaks. In the case of Japanese women, this difference is marginal, but for Hong Kong women academics the difference is substantive; female academics who had not taken a career break published on average 2.3 times more articles. Also, US female academics in science and engineering who had taken a career break were less productive.

With respect to children, more male academics had children than female academics across the five countries, however, as is shown this difference is variable. For example, only 31% of female academics, as opposed to 57% of male academics in Japan have children, whilst in the USA 31% of women and 36% of men have children (Table 11).

Table 8. Gender and marriage status (*t*-test).

	Finland		Germany		Hong Kong		Japan		USA	
Married	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yes	9.15	6.62	6.71	4.43	11.09	7.98	10.05	4.63	4.91	3.93
No	5.03	6.12	3.93	2.71	8.19	4.51	5.39	3.77	3.93	2.56
Average number of articles	7.09	6.37	5.32	3.57	9.64	6.25	7.72	4.2	4.42	3.25
F (Sig.)	8.786*	1.356	5.651*	10.060**	0.473	4.633*	12.490***	1.870	1.437	3.221

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 9. Gender and career break (%).

	Male	Female
Germany	4.3	23.8
Finland	12.3	39.3
Hong Kong	3.3	14.8
Japan	0.7	15.9
USA	4.7	27.2

Table 10. Gender, career break and number of articles (*t*-test).

	Finland		Germany		Hong Kong		Japan		USA	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yes	7.62	4.97	8.83	7.73	6.09	7.07	8.08	5.89	3.96	3.67
No	6.06	3.75	8.88	6.16	10.88	7.24	9.72	4.01	4.87	3.57
F	3.973*	6.378*	0.031	0.648	2.427	1.273	0.462	8.581*	0.175	0.241

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 11. Percentage of academics with children (within gender).

	Male	Female
Germany	449 (56.3)	127 (39.8)
Finland	353 (51.7)	319 (45.8)
Hong Kong	285 (57.1)	102 (47.0)
Japan	717 (57.3)	38 (31.4)
USA	237 (36.1)	145 (30.5)

And of those academic women who have children, how has this third family-related variable affected their research output? Again, with the exception of academic women in the USA, overall family is not operating as a form of negative equity in the prestige

Table 12. Gender, children and number of articles (*t*-test).

	Finland		Germany		Hong Kong		Japan		USA	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Yes	6.14	5.31	10.43	8	12.05	9.02	8.125	4.16	5.185	4.095
No	6.07	4.03	7.535	5.67	11.22	8.37	7.44	4.09	4.855	4.215
F	0.479	7.910**	3.183	4.638*	2.207	0.002	0.942	2.662	1.483	0.422

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

Table 13. Gender, number of children and number of articles (correlation).

	Finland		Germany		Hong Kong		Japan		USA	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Correlation	0.019	0.117**	0.128**	0.174	0.159**	0.010	0.040	0.027	0.032	0.020

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

economy. Female academics with children in Japan and Hong Kong are marginally more productive. Women in Germany, and particularly Finland, are more productive in a statistically significant way (see Table 12).

Again, on further analysis by discipline women with children in the humanities and social sciences in Finland and Japan, along with women in the sciences and engineering in the USA, were marginally less productive than those women without children. If we consider the linear relationship between the number of children academics have and their research output, we can see (Table 13) that having more children certainly does not have a negative affect on academic women and in the case of Finnish women actually correlates with a positive outcome

Possible explanations?

Thus far we have established within the context of this survey data that academic women are publishing fewer journal articles and book chapters. However, familial responsibilities are generally not adversely affecting this situation. Family is not in all cases operating as a form of negative equity in the prestige economy of higher education. There are a small number of studies that corroborate this finding, for example, Sax et al. in a survey of over 8000 academics in the USA concluded 'in short, family variables contributed little or nothing to the prediction of faculty research productivity' (Sax et al. 2002, 435, see also Kyvik 1990). This finding, however, is generally inconsistent with, and counter-intuitive given, our common understanding of this issue. Let us now consider, first, why this data seem so counter-intuitive and second, what therefore can account for the gender gap in research productivity.

As noted earlier, the CAP survey provides an interesting contrast to those studies that have largely drawn on interview data to explore the position, experience and opinions of academics. Our tentative explanation, as to why our findings seem counter-intuitive, is the power of both 'narrative' and discourse in positioning family-related variables as a

significant factor impacting on research productivity. Narrative models of analysis can provide us with an insight into how human beings understand and enact their lives through stories, how interview respondents explain their situations and how researchers can seek out causes to explain an end outcome by considering critical moments (Sandelowski 1991). What if academic women are explaining, or even taking individual responsibility, for their apparent 'failure' to compete in the prestige economy of higher education by appealing to factors (e.g. family-related) that first, do not account fully for the gender gap in research productivity and second, are factors that the academy could, but often does not, take into account in assessing performance? For example, in a qualitative study of the experiences of female academics in a US research-intensive university, Monroe et al. (2008) found that a number of women did not judge balancing work and childcare as relevant to the university. Rather, such issues were seen as the responsibility of the individual. Similarly, Grummell, Devine, and Lynch (2009) found that the language interviewees used about balancing childcare and work responsibilities in a study of senior appointments in Ireland was significant. Caring was assumed to be a woman's problem see Aiston (2011) for a fuller discussion of this point).

In addition, to what extent is there a discourse operating which conveniently attributes, be it unintentionally, responsibility for the research productivity gender gap to factors perceived to be largely beyond the influence of the academy? For example, the following quotation from a respondent in Morley's study on women in the global academy illustrates this point:

> A woman in Japan has to take care of her children, as well as both her parents, and sometimes even her husband's parents, beside the domestic duties on daily life. They do not have enough time to concentrate on doing research. (Morley 2014, 122)

As we have seen from the CAP data, however, Japanese academic women with familial responsibilities are not particularly at a disadvantage in terms of research output.[6] Similarly, interview data from Baker's study (2013) also provide an insight on this issue. The following quotation describes a young female academic's dilemma with respect to having a second child:

> We're feeling – well [child's name] is so great maybe we would like to have a second one … but one of the big things is for me feeling like this has had a big impact on publishing career. (Baker 2012, 110)

It is critical to bring to the fore research which questions, or problematises, the link between academic women, family-related variables and research productivity for a number of reasons. First, an explanatory framework that over-relies on family-related variables to account for the gender gap in research productivity may well be distracting us from other, equally relevant or more significant explanations. Second, the widely held assumption that family responsibilities compromise a woman's academic career affects both the recruitment and the retention of women within the profession (Sax et al. 2002, Van Anders 2004; De Welde and Laursen 2011).

Before moving on to consider other potential factors that could account for women producing less than their male colleagues, let us reflect on how women with familial responsibilities might maintain competitive levels of research productivity. Hamovitch and Morgenstern's (1977) study of child-rearing and women academics' research productivity hypothesised that women with children attempt to do more with their limited time and take time out of other activities, particularly their own free time (Hamovitch

and Morgenstern as discussed in Sax et al. 2002). And for those women who interrupt their careers for caring responsibilities, is it the case that these women continue to work, particularly on their research, during this 'break'? Given the entrepreneurial nature of research, stopping work completely may be unrealistic, as the following reflection by a British academic on maternity leave suggests:

> Not only will a research-active academic find it difficult to extricate herself from her career for the full 12 months to which she is legally entitled, in all likelihood she will also not really want to be out of the loop for so long – no more than a small business holder would countenance closing her shop for a year. (Braun 2014)

There are a number of important factors that we might consider in exploring further explanations for the research productivity gender gap. One factor is allocation of time. The CAP survey asks respondents to detail how many hours a week they typically spend on a number of activities (e.g. teaching, research, service and administration[7]). Table 14 shows the average number of hours per week spent on research by academics when classes are in session. The analysis indicates that the difference in time spent on research between men and women is statistically significant in the context of junior women academics in Hong Kong and the USA: women spend less time on research. However, we can also observe some interesting differences in the case of Hong Kong, Japanese and US senior women academics when looking at the weekly average hours spent on research.

If women academics, particularly women academics in the USA, Hong Kong and Japan, are spending less time on research, where is their time being spent? Junior and senior academic women in the USA are spending more time on administration than their male colleagues (this is statistically significant in the case of junior women).[8] Senior women in Hong Kong are spending 10%, whilst junior Hong Kong women are spending 17% more of their time on teaching in contrast to their male colleagues[9] and senior Japanese women are spending 41% more of their time on teaching in contrast to their male colleagues.[10] It would not therefore surprise us to see that women academics in Hong Kong and Japan have the lowest research output. This may suggest that there are workload allocation issues. Kjeldal, Rindfleish, and Sheridan (2006) found evidence of male academics using male networks to negotiate more favourable workloads, whilst Barrett and Barrett (2011) highlight how workloads can disadvantage women. Institutions therefore need to be pro-active with respect to workload allocation:

Table 14. Gender and time allocation – research.

	Senior			Junior		
	Male	Female	*t*-test	Male	Female	*t*-test
Finland	12.81	11.27	2.416	17.56	17.59	5.125
Germany	13.87	14.02	3.539	17.33	16.32	0.387
Hong Kong	17.32	14.81	1.727	17.34	13.01	13.318***
Japan	17.02	13.12	1.383	16.44	16.32	0.377
USA	13.60	10.92	3.348	14.00	10.23	9.175**

Note: *$p < .05$, **$p < .01$, ***$p < .001$.

> Departments need to be keenly aware of any gender bias in the allocation of work: are women more likely to be assigned heavy teaching and administrative loads and pastoral care, thereby limiting their research capacity? (Aiston 2011, 288)

A second factor to consider with respect to the research productivity gender gap is the process itself: 'As much of the research-based prestige economy relies on peer review, this raises questions about gender bias and discrimination in the process itself' (Morley 2014, 116). Publication rates relate to disciplinary context and area of specialisation and tend to be lower in the humanities and social science, where more women academics are located. In addition, a lower value is awarded to feminist scholarship or research related to women. Male colleagues are less likely to read women's research, which in turn leads to women's lower visibility as productive academics and collaboration with male colleagues (Baker 2012). For women academics in the sciences and engineering, this is particularly an issue: there are relatively fewer women, thereby placing them at a disadvantage because it is more difficult for them to find collaborations (Bentley 2003 discussed in Tower et al. 2007). Women are also less likely to be journal editors and sit on editorial boards. For example, in the 12 major medicine journals, only 25% of editors and 17% of board members were women (Kennedy, Lin, and Dickstein 2001); out of 12 management journals, women accounted for less than 10% of the editorial boards (Metz and Harzing 2009) and in the political sciences only 18% of women were editors when an analysis of 50 journals was undertaken (Stegmaier, Palmer, and Assendelf 2011). The manifesto for change calls for editorial boards, which play significant gate-keeping roles, to be more transparent in their selection processes and policies on gender equality.

Conclusion

Before stating our conclusions, it is important to discuss what we are *not* suggesting. First, we are not denying that women academics struggle more than male academics with work–family balance, that they sacrifice more and that this struggle is significant (Neale and Ozkanli 2010; Baker 2012; Beddoes and Pawley 2013). Those women with familial responsibilities who continue to be productive are clearly 'overextended' (Sax et al. 2002). On the basis of this survey data, we are not arguing against the 'motherhood penalty' (Baker 2012) and suggesting that being married and having children gives academic women 'credits' as opposed to 'penalties'. Second, leading on from this point, we are not promoting a hetero-normative model of social organisation, in which the nuclear family is more enabling with respective to research productivity and that those academic women (or men) who transgress this traditional family structure are less productive as a result.

Within the context of the CAP survey data, we also have no indication of the extent to which women have support with their domestic lives. However, without further research, we would exercise caution in suggesting that the women academics in this sample, who are married, have taken career breaks and/or have children are productive because they have access to a level of domestic support which enables them to be so. In addition, nor are we denying that the academy should strive to introduce policies to support work–family life and performance assessment structures that take into account the gendered dimension of care work.

We are also not privileging the aforementioned CAP survey data above the extensive qualitative research that is more likely to indicate, in contrast to the findings within

this study, that the link between gender, family-related variables and research productivity is significant. What we have done is to explore what might account for this apparent tension.

What we *are* suggesting, however, is the importance of bringing to the fore research that does question, that does challenge, the link between women's academic research productivity and their familial context. Within this comparative study, we have seen that family is not in all cases operating as a form of negative equity in the prestige economy of higher education. An over-reliance on an explanatory framework which positions family-related related variables as central with respect to the gender research productivity gap has the potential to draw our attention away from other, equally as significant structural and systemic discriminatory practices. These are practices within the profession, which we might more strongly advocate to change. Examples are workload allocation – a critical issue upon which institutions have the capacity to take direct action – and the research production process. The comparative aspect of our research has strengths in that we have been able to explore the common experiences of academic women with respect to research productivity. By looking at academic women in different cultural settings, our research has also highlighted that women academics in Japan and Hong Kong particularly face challenges with respect to this aspect of their academic role. This may be an indication of a wider Asian problem that would benefit from further investigation.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

1. See Leathwood and Read (2009). This research highlights both the global differences in the participation and achievement of women students' in higher education, along with the gendered stratification of subject choice.
2. The manifesto was an outcome of a workshop, *Absent talent: women in research and academic leadership in East Asia*, organized by the British Council held in Hong Kong in September 2012.
3. In the CAP survey, senior and junior academics are classified as follows in each country: Finland: Senior (Senior researcher, Principal lecture, Professor, other senior) and Junior (Researcher, Lecture, Assistant professor, Other junior, Assistant) Germany: Senior (Professor) and Junior (Junior professor, other academic position above entrant position, other academic position on typical entrant position) Hong Kong: Senior (Professor, Associate professor) and Junior (Assistant professor, Lecture, others) Japan: Senior (Professor, Associate professor) and Junior (Lecture, Research Associate, other) USA: Senior (Professor, Associate professor) and junior (Assistant professor, Lecture, other).
4. We classified academic disciplines as follows: Humanities and social science – to include teacher training and education science, humanities and arts, social and behavioural sciences, business and administration, economics, law Science and engineering – to include life sciences, physical sciences, mathematics, computer sciences, engineering, manufacturing and construction, architecture, agriculture, medical sciences.
5. The Finnish government guarantees 105 days maternity leave, 158 days parental leave, 18 days paternity leave and bonus leave for fathers (Ministry of Social Affairs and Health 2006).
6. We acknowledge that the CAP survey does not provide data with respect to *ongoing* parental care.
7. Teaching (preparation of instructional materials and lesson plans, classroom instruction, advising students, reading and evaluating student work) Research (reading literature, writing, conducting experiments, fieldwork) Service (services to clients and/or patients,

unpaid consulting, public or voluntary services) Administration (committees, department meetings, paperwork) Other academic activities (professional activities not clearly attributable to any of the categories above).

8. Senior academic women spent on average 9.50 hours a week on administration (male senior colleagues spent 8.29). Junior academic women spent on average 6.49 hours a week on administration (male junior academics spent 4.98). The *t*-test indicated this as significant (10.495***).
9. Senior academic women spent on average 19.23 hours a week on teaching (male senior colleagues spent 17.41). Junior academic women spent on average 23.47 hours a week on teaching (male junior colleagues spent 20.06).
10. Senior academic women spent on average 28.32 hours a week on teaching (male senior colleagues spent 20.08).

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