

6 A gendered pipeline typology in academia

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Introduction

Scientific and academic careers are currently not only characterised by a lengthy period of tertiary education (undergraduate, postgraduate and doctoral period), but also by a long period of professional instability, resulting in a permanent position, often late in the career. They are, furthermore, obtained after a heady competition between researchers guided by an assemblage of diverse quantitative and qualitative “excellence” evaluation criteria. Researchers are also required to manifest a “moral” engagement in their work, accepting long working hours and a real willingness to be geographically mobile. The skills are varied and involve a myriad of multi-tasking, but with little administrative support. This brief portrait may be a caricature, but it nonetheless expresses a situation concerning both men and women engaging in academia.

A young woman in Europe, for instance, can easily dream of embarking on a scientific career, regardless of the discipline. She will have the same if not slightly higher chances of obtaining a Master’s degree than a male peer her age, although some disciplines still remain male strongholds. However, the probability of her going on to do a doctoral degree, pursuing a post-doctorate, accessing a permanent position and climbing the scientific and academic career ladder decreases from step to step. The image of the “leaky pipeline”, which may of course be criticised due to a masculine vision of linear careers, can nonetheless express this progressive disappearance of women while climbing the career ladder (Alper 1993; Berryman 1983). This phenomenon can be readily imagined and helps in identifying the situation, but the multiple underlying conditions and mechanisms are not easily decipherable.

Based on the research reports produced in the framework of the European research project GARCIA – Gendering the Academy and Research: Combating Career Instability and Asymmetries, this chapter underlines the importance of understanding the “pipeline” from a multidimensional and multi-level perspective (macro, meso and micro). We will begin by presenting our approach (first section), in order to describe how we have conceived analysis of the data (second section). We will then deduce three ideal-types of gendered pipelines, which we will develop with particular attention to the costs that each Type

generates for science, the institution and the individuals, as well as to their impact in terms of gender. Before concluding, we will discuss the secondary effects of the mode of functioning of research and academia, but also the perspectives we envisage to counter these effects.

Moving away from classic perspectives on leaky pipelines

The high level of uncertainty and precariousness among early career researchers in academia still remains an invisible issue in many European research institutions. It is this fragility of early career researchers/academics in their career paths and their respective academic organisations that has been the centre of our focus in the GARCIA project. Along with a number of contemporary European studies, the project establishes that women's moving away from the scientific or academic path leading to higher positions does not happen as simply as might be imagined at first glance (Dubois-Shaik and Fusulier 2016; Fassa, Kradolfer and Paroz 2012; Le Feuvre 2009; Grant, Kennelly and Ward 2000), and that rather than adopting mono-causal explanations, we have to take a more composite and systemic view of causes and effects when thinking about the "leaky pipeline".

The university's functioning methods produce the sort of gender inequalities described by the expressions "glass ceiling" (Hymowitz and Schellhardt 1986, redefined as "iron ceiling", Fassa and Kradolfer 2010), as not being able to ascend to higher positions, and "sticky floor" (e.g. Booth *et al.* 2003), as getting stuck in less gratifying and less valued tasks. The specific causes of these inequalities are less rooted in direct and explicit discrimination (Musselin and Pigeyre 2008), than in the dynamics of a gendered organisation (Acker 1990). These dynamics include a university management that resembles an old boys' club (Case and Richley 2012). Furthermore, a "Matilda effect" (Rossiter 1993; Fassa, Kradolfer and Paroz 2012) can be observed, penalising women with regard to their scientific productions, whereby their work is often attributed to their male colleagues. A phenomenon buttressed by a closely related "Matthew effect" (Merton 1969), explaining how eminent scientists will often get more credit than a comparatively unknown researcher, even if their contribution is shared or similar.

The more classic perspective draws the picture that often "promising" women fall out of scientific and academic careers after their PhDs and that it is presumed that everything happens in these professional trajectories to make them leave as though it were some kind of self-elimination, a chain of decisions taken more or less consciously, but always freely, by young women, who decide to do something else than pursue a scientific career (maternity, family life, or following their spouses to another country for his job, etc.) (Beaufays and Kraiss 2005). Other studies often focus on how certain fields are still underrepresented by one sex and on how traditional gender stereotypes persist in fields such as STEM (Science, Technology, Engineering and Mathematics) for women or SSH (Social Sciences and Humanities) for men (Blickenstaff 2005), tracing these discrepancies back to lacking motivations or gendered tracking during early (primary

school) and latter (secondary and higher) educational trajectories. Yet other more contemporary research speaks about gender discrimination in recruitment, where women are systematically underselected for permanent academic positions and for promotions to higher leadership positions (Morley 2013; Van den Brink and Benschop 2012).

When looking at gender policies grouped together as “gender equality” policies, these too have so far focused rather spontaneously on improving figures and representations in professorships and leadership positions (albeit still without much effect). This has often resulted in policies that have targeted individual trajectories through personal coaching rather than taking a larger picture of the systemic and organisational environment levels of the pipelines (see other chapters in this volume). In short, research institutions more rarely question the pipelines themselves, although this subject has already been broached by numerous research studies in different national contexts. Pipelines are often seen as either career trajectories, or organisational career pathways that point to “leaks”, which are undeniably present in all the case-study institutions involved in the GARCIA project (see Dubois-Shaik and Fusulier 2015, 2016). However, we would argue that we cannot simply adopt an approach of “filling the gaps” or of pointing the fingers at gatekeepers. Attention has to be drawn to how research institutions “do gender” (Gherardi 1994) and are gendered organisations (Acker 1990), which means that the social division of work between the sexes is translated in distinctive ways in structured institutions; in the principle of its organisation, in the habits of work at the heart of the institution; in short in the practice of scientific work. We extend this definition to include the welfare and gender regimes each institution is situated in. The combination of various results enabled us to glean this more holistic and composite picture of the pipelines in contextualised case studies. The Gendered Pipeline Typology proposed here shows, in a more nuanced way, that gender inequality is deeply entrenched in organisational, configurational and contextual work (and social life) factors, which make access, choice and work different experiences for women and men researchers and academics.

Thus, “gendered pipelines” is an analytical concept allowing research institutions to situate themselves in a more nuanced framework in terms of gender inequality in academia. The diverse results and analytical processes in the GARCIA project have enabled us to redefine a new combined approach to tackling questions about the “leaky pipeline” and other interrelated phenomena, such as “glass ceiling”, “sticky floor”, “Matilda- and Matthew effects” amongst others.

Methodology

Research context

This chapter is the fruit of a meta-analysis of the case studies conducted in six institutions, and their respective societal contexts (Belgium; Iceland; Italy; the

Netherlands; Slovenia; Switzerland). The research project focused on both STEM and SSH disciplines. In terms of leaky pipelines, we will now provide a short overview of the key results recorded in each case study context.

In Belgium (see Dubois-Shaik, Fusulier and Vincke 2015), the gender question remains an open one, even if significant advances towards greater equality are observable. Although women are now in the majority in higher and university education, with higher graduation rates than men, two important reservations must still be taken into account. First, in accessing the highest level of qualification, i.e. the doctorate, males are in the majority. Second, a horizontal segmentation between “male” tracks of studies (sciences and technology) and female (human and social sciences) is still being reproduced. What is notable is that, as is generally the case for French-speaking Universities, women in academic/scientific careers work part time more often than men (13 per cent vs 6 per cent), but those part time positions are in lower scientific/academic career posts, such as assistants. The higher up the ladder one climbs, the more full-time positions seem to be the rule. Not only, therefore, do women (and men) have to meet high demands in research/teaching, they also have to make major commitments in terms of institutional investment and presence – to integrate into a hyper-complex system of bureaucracy and institutional culture. There seems to be an increasing requirement of “omnipresence” in all three pillars (teaching, research and service), with each pillar increasing its level of demands and the complexity of the personal engagement required. It may well be argued that the above elements represent important issues in work/life reconciliation and equilibrium in maintaining a family life, and that wanting to climb the career ladder also means making important choices and accepting pressures in terms of personal life. It is noteworthy those occupying the highest posts attained by women at the Belgian university included in the research (vice-rector and general administrator, and some other heads of units, such as institute heads or deans) are generally without children.

When analysing data related to the leaky pipeline at the national level in Iceland (see Smidt, Einarsdóttir and Pétursdóttir 2015), it is immediately obvious that in terms of student numbers women dominate higher education. This might appear to be a positive development at first glance, but on closer inspection it is evident that even though women are in the majority, they are so predominantly in SSH fields, which enjoy the least amount of funding, the highest teacher-to-student ratio (i.e. heavier workloads), the least amount of stature, and the fewest options for a future career in academia. Inversely, STEM fields, which are dominated by men, receive considerably more funding and enjoy a higher stature even though they attract a much lower number of students. As we move up the academic ladder we also find that men overwhelmingly occupy the higher stature academic positions. Consequently, although it is important to address the question as to why there are so few women in STEM fields and why women are distanced from academic careers the higher up the career ladder we get, it is equally important to address the question of why there are so many men. On the macro-level, it is possible that men may feel pressured to conform to masculine ideals

of stature and prestige and so end up choosing a technical field of study in a homo-social environment that is sure to “land” them a well-paid job which will confirm their breadwinner role. In the same vein, men may opt out of certain careers in SSH fields because an overarching culture of masculinity does not associate male identity with SSH related concerns.

Early-stage scientific careers in Italy (see Bozzon, Murgia and Poggio 2015) are characterised by: (1) that fact that gender asymmetries are already persistent and reproduced by the early post-PhD career stages, (2) a rise in the level of precariousness and job instability experienced by the new generation of PhD holders, (3) an increased level of competition for permanent positions due to the university system’s inability to absorb the rising numbers of PhDs, in turn resulting from the limited development of research positions in other sectors as well as from the low employability level of PhDs outside academia, (4) persistent disadvantages suffered by women both in terms of scientific productivity and during selection processes and (5) the instability of research projects affecting the quality of the research output and the type of knowledge elaborated in academia. In the early career stage, female employment positions appear less stable and less well paid than male ones, and more influenced by family and personal situations. These weaknesses are generally more evident in the STEM disciplines, but SSH fields too, where women are more represented, are not immune from unfair mechanisms that foster processes excluding women from career advancement, governing bodies and positions of power. Growing levels of precariousness and early-stage career instability, together with low chances of obtaining permanent positions within the academic system, make it necessary to support PhD holders. This support involves developing skills and competencies capable of leading to inter-sectorial careers as well as to finding effective strategies for following their personal career paths. The general vulnerability of post-doctoral positions needs to be curtailed, beginning first and foremost with a redefinition of their ambiguous contractual conditions.

In international comparison (OECD, EU), the Netherlands (see Herschberg and Berger 2015) has one of the lowest numbers of women full professors. In both STEM and SSH fields, on both the national and organisational levels, the leaky pipeline is present. The numbers and percentages of women in academic positions differ between STEM and SSH domains, on both the national and organisational levels, but the trend of decreasing numbers makes itself felt all along the pipeline. Yet, in both participating GARCIA departments in the Netherlands, we see higher percentages of women full professors than women associate professors. The number of women full professors is higher than the national average in SSH, but lower in STEM. In both we found an increasing number of women non-tenured staff over the years 2010–2014, with no increase in the number of women tenured staff. This indicates a growing leak in the pipeline at the assistant professor level. In the STEM department studied, the number of women staff leaving seems to be disproportionate, when compared to the number of women employed in the period 2010–2014. This is not the case within the SSH departments. In general, the Netherlands has the highest number of women

working part-time, and a one-and-a-half earners model is prevalent. Care divisions between men and women are still conservative. However, the prevalence of part-time work does not apply to women in academia. The research project also showed that Dutch women academics more often have no children, or fewer children than women outside academia. A pay gap exists between men and women in tertiary education.

In recent decades, women in Slovenia (see Istenič 2015) have entered higher education and science massively. Among the graduates, 60 per cent are women and among the PhD graduates almost half are women. However, their careers are usually completed at the assistant or assistant professor levels; 40 per cent of women reach those positions, while only 20 per cent of women with completed PhD studies reach full professorship. The analysis highlights the presence of the leaky pipeline phenomenon in science at the national level; a clear picture emerges of vertical gender segregation in academic career paths among PhD holders. However, on the level of individual STEM/SSH departments, this picture is not as unequivocal; it shows that the reality is far more complex. Female students greatly outnumber male students in SSH fields, particularly in education, health and humanities, typical “female sciences”, whereas men strongly outnumber their female colleagues in engineering, manufacturing and construction, typical “male sciences”. A comparison of statistical data on research and teaching staff with data pertaining to PhD students clearly indicates ongoing gender segregation in science. In their careers, PhD holders, more frequently women than men, are faced with an accumulation of disadvantages that arise in both their working environments and family lives, with implications for their less successful scientific careers.

Structural characteristics of the gender regime in Switzerland (see Kradolfer 2015) have strong impacts on women’s careers with, for example, very low levels of childcare provision, extremely high childcare costs, high levels of horizontal and vertical labour market segregation, and relatively large gender pay gaps, particularly at the upper reaches of the occupational hierarchy. Women tend to work part-time and/or take extended breaks from the labour market when their children are young (42 per cent in 2012). The academic occupational hierarchy continues to manifest a clear “glass ceiling”, although there has been considerable improvement in women’s access to higher education over the past 15 years. Women are now well represented amongst doctoral students and fill a significant proportion of temporary scientific research positions, but are much less likely than their male counterparts to reach permanent professorships. Although the gender policy target of 25 per cent of professors being women has yet to be reached, there has been a significant increase in the feminisation of intermediate levels of the academic hierarchy. The proportion of women among funded PhD students and (non-tenured) postdoc research positions increased from 27 per cent to 40 per cent between 1998 and 2007. In addition, women now represent over 40 per cent of non-tenured scientific collaborators and non-professorial teaching staff in universities. Whilst women have increased their share of university professorships, from 9 per cent in 2006 to 17 per cent in

2010, the proportion of foreigners amongst the female academic population has increased from 46 per cent to almost 56.4 per cent over the same period, indicating a failure to mobilise women already within the university pipeline. Increasing women's access to scientific occupations is a concerted policy objective and there are signs of quite strong institutional commitments to the fight against horizontal and vertical segregation. But in a country with a low unemployment rate, a small university-educated population and relatively well-paid job opportunities in the private and public sectors, Swiss higher education institutions do not necessarily represent a particularly attractive employer, notably because of the large proportion of temporary, fixed-term contracts that characterises the early stages of the academic career.

Comparing all the countries together, the number of doctoral students and PhD graduates are central indicators of a country's research potential. According to Eurostat data (2015), there were an estimated 717,000 doctoral students in the EU-28 in 2012 and women accounted for 46 per cent of doctoral students and 47 per cent of PhD graduates. There has been an increase in the total amount of PhD graduates in all the countries involved in the GARCIA project. The gender split of doctoral students and doctoral graduates across the countries involved in the GARCIA project was balanced or slightly in female majority in Italy, Slovenia and Iceland in 2012. By contrast, women accounted for 44 per cent of all doctoral graduates in Belgium, the Netherlands and Switzerland. The process of feminisation at this level of specialisation should improve soon. All national case studies highlight the persistence of a strong segregation of men and women across fields of study.

Academic careers remain markedly characterised by vertical and horizontal segregation even if there are important differences across countries. Among Grade A staff, the presence of women has markedly increased in Switzerland, Iceland and Slovenia. In these cases, the number of women among full professors more than doubled between 2004 and 2010. Only Switzerland reached the target of 25 per cent women among full professors, while in Belgium and the Netherlands that proportion remained below 15 per cent. Female PhD holders have systematic disadvantages when compared with male PhD graduates: (1) higher risks of being unemployed or being employed in fixed term and part-time positions, (2) lower chances of performing research and development activities in their jobs or of being employed as researchers and (3) lower average wages.

The leaky pipeline and glass ceiling phenomena can be recorded for all the countries participating, whereby fewer women are recorded the higher we climb the scientific/academic ladder. An important fact remains that in most countries the bottleneck is located at either the doctoral or postdoctoral levels, with the difficult jump to obtaining tenured positions. Again, this may seem to be nothing new in terms of the famous scissor shaped curves. An important result obtained is that the number of postdocs and assistant researchers with non-permanent contracts is rising significantly, with institutions hosting a growing number of temporary researchers. These, we would argue, are a

“floating and invisible” research body, contributing greatly to the production of knowledge and teaching, but institutionally remaining largely invisible, unstable and unaccounted for.

Data and analysis

We have looked at the leaky pipeline and interrelated phenomena through quantitative data, and through qualitative analysis using various data from different reports (Dubois-Shaik and Fusulier 2015, 2016; Steinþórsdóttir *et al.* 2016; Herschberg, Benschop and Van den Brink 2015; Le Feuvre 2015). Particular attention was paid to the early stages of academic and scientific careers.

For each case study, the welfare and gender regimes were analysed using secondary data from national, regional and institutional datasets concerning education, family, formation patterns, employment, child-care, health, equal opportunities and work–life balance for the six case study countries and institutions.

Organisational data about the six target institutions was gleaned partly from existing data sources and, to a major extent, by creating a new dataset concerning mover/leaver lists, gender differences in leave, leave and welfare policies and more general figures concerning gender in employee patterns. Funding patterns were discerned for project funding in both departments, in order to map how funding was distributed between sexes in each department for each institution. Moreover, we made a map of existing research and teaching in terms of gender sensitivity (courses that referred in an explicit or implicit way to gender or made use of a gendered perspective in aims, methods and approaches).

For “giving voice”, three different groups of actors were studied: (a) movers (researchers/academics, who have moved to other research institutions) and leavers (researchers/academics, who have left academic and research careers); (b) postdoctoral researchers, working at the six GARCIA research institutions at the time of the empirical research; (c) fully appointed academics, within five years of their appointment as permanent academics. Both female and male interviewees were targeted, and from two different departments, one of which was an SSH department, and the other a STEM department.

Furthermore, for an empirical analysis of organisational structures, interactions and life at the six target research institutions, focus groups and interviews were held with senior full academics and professors, department heads and members of recruitment committees. The reports cited enabled us to identify the complex and multivariable nature of the pipeline(s). They evoke the extent to which the social division of work between the sexes is indeed translated in distinctive ways in its structured institutions. First, in the gender and welfare regimes, within which the institution is embedded. Second, in its work ethos and culture. Third, in the principle of its organisation, influenced by external and internal pressures and discourses. Fourth, in the kinds of policy responses that have been evoked. Fifth, in the habits of research/academic work. We must not forget the specificities of scientific fields, sectors and institutes (SSH, STEM),

which can play a role in the way work is gendered. We also look at a role of discursive resources (Kuhn 2006) that are mobilised by actors when making sense (Weick 1995) of their work. And, not least, the modalities of careers at the heart of the institution. The gender dynamics that operate amidst these different mechanisms at play, therefore, not only reflect or change external societal and socio-economic trends, but also contribute to enhancing, reproducing or reinforcing certain gender regimes, work ethics and cultures, discourses, and organisational structure/modes of functioning. This in turn shapes career modalities in particular, gendered ways. "As a consequence research tools are now needed with which to grasp the processual character and complexity of the factors at work" (Poggio 2006, p. 229).

From a transversal analysis of the GARCIA case studies, we have gleaned particular features emerging as specific configurations and combinations of different dimensions: (a) national gender and welfare regimes; (b) previously existing gender policies; (c) quantitative analysis of the leaky pipeline, including the national and organisational quantitative data; (d) qualitative narrative data from interviews with three sub-groups (movers/leavers, postdocs and newly tenured researchers/academics); (e) recruitment and discursive resources; (f) organisational characteristics.

Faced with the breadth of data presented in the reports, we have operated a double process of identifying similarities as well as differences between the different cases, in order to be able to identify different rationales or logics, defined as ideal-types from a Weberian perspective (Weber 1922). By ideal-type, we refer to an intellectual reconstruction, reducing the complexity of information gathered in the case studies and creating a kind of caricatural representation, which expresses a logic that was manifested in certain case studies, without, however, inserting a group of particular institutions into a classification.

In other words, revealing a strong common basis in all six case studies,¹ comparison of the various GARCIA case studies beneficiaries indicates recurring configurations that assemble certain features and characteristics. Looking at proximities and distances between the case studies, we observe a series of organisational, social and career-based polarities. For example, there is a tendency for certain organisations to define themselves as enterprises having to fare in an international market, whereas other organisations perceive themselves as major social institutions placed in their immediate environment, and still others present themselves as autonomous professional spaces. The employment market dynamics range from very competitive employment markets, open to highly qualified workers, to employment markets saturated with a high level of unemployment even for highly qualified workers, while also showing intermediary forms of markets that are relatively open to doctorate holders, but nonetheless uncertain in terms of professional conversion. The recognition of the doctoral status and the social security given to researchers is far from homogeneous; researchers may thus find themselves in highly precarious financial situations without access to social security, whereas others seem to be fully integrated into a well-regulated salary system ensuring social protection. Similar differences

can be observed in terms of gender policy and policy concerning work/family articulation, which may range from being well developed or simply non-existent. Understandably, these different institutional and socio-economic characteristics weigh heavily on career forms and experiences. Three Types of careers and related experiences are discernible: persisting in precarious career paths; continuing in ambivalent career paths; striving to win in competitive career paths.

Simultaneously, the different organisations, contexts and career paths can be situated in what is at stake for different levels of the pipelines, in other words “the costs”. Without adhering too closely to social exchange theorists, by “costs”, we would understand the “price to pay” or the challenge for a certain orientation, perspective, objective or underlying principle of an entity that operates on the pipeline. We locate this entity at three levels in relationships:

- the macro-level of science as an entity, not with a capital S, but rather science as a collaborative, collective work and product of an organisation;
- the meso-institutional level as a working, interacting and operational entity with particular common institutional missions;
- the micro-individual level of a worker and composite being as an entity.

We may refer to the level of costs that the particular academic/scientific career involves: the level of costs that the institutional and organisational conditions, demands and work culture/organisation involves; the level of costs that science as a product and the overall missive of research and teaching involves. We may refer to specific configurations being more costly at the individual level and perhaps also at the institutional and organisational levels. An important part of reading costs is that they may represent different impacts upon gender dynamics. Thus, in addition to the three levels, we can deduce how costs affect the gender balance and inequality in the various Types of gendered pipeline configurations and institutions.

These different dimensions (organisations, contexts, career paths and costs) combine typically to outline a certain rationale, in other words a “gendered pipeline” or a Type of career path and organisation showing different cost ranges and levels. We distinguish three:

- Type 1: persisting in precarious career paths in “Mandarin” organisations, with high cumulative costs;
- Type 2: continuing in ambivalent career paths in “Missionary” university institutions, with moderate costs;
- Type 3: striving to win in competitive career paths in “Entrepreneurial” organisations, with specific costs.

Persisting in precarious career paths in “Mandarin” organisations, with high cumulative costs: Type (1)

This first Type refers to a university that sees itself as an autonomous professional space, operating with internal professors’ clubs that manage their own

succession by looking for the most devoted and persevering amongst their “young” researchers. The privileged link is the domestic or filial link, meaning one based on interpersonal connections, knowledge of internal codes, and an acceptance of hierarchical relationships. Power is concentrated at the level of well-established professors enjoying a good deal of autonomy despite bureaucratic tendencies and a competitive logic. The problem of gender is little discussed and very cosmetically addressed at the policy level. There is no real active gender and equality policy, neither on the national level nor on the institutional level in academia. Early career-stage researchers and academics, particularly women, experience work/family conflicts. Maternity and academic careers are often considered and lived as incompatible with the kinds of demands and conditions research/academic careers impose; especially when job precariousness and hyper-productivity are clear requirements for CV building. Women sacrifice motherhood in order to persevere or survive in their careers.

This Type of pipeline is characterised by traditional societal gender roles: the male breadwinner and female carer model. Moreover, in line with this traditional role distribution, few or no effective childcare and elderly support systems exist in such a society. This is replicated within the university system itself. On the labour market, the economic participation rate of women is still considerably lower than that of men. Women’s access to the labour market, remuneration, career advancement, promotion to positions of leadership and new business opportunities remains relatively low. Young women are more likely than young men to be unemployed, and to work in less stable forms of employment and in the lowest-paid sectors (horizontal segregation). This too is replicated in the academic sector, with an important sticky floor in terms of assistant instructors, non-tenured positions (and technical and administrative staff) mostly filled by women. The academic sector replicates that society’s major gender pay gap. The structural situation of young researchers is characterised by a low salary level, lack of social protection, and few opportunities on the labour market, etc. Despite higher education becoming increasingly feminised, gender stereotypes persist in some fields.

In terms of work culture and organisation, there is a strictly linear academic path, with few positions and stringent competition, with an emphasis on productivity recruitment criteria (numerous publications in “high-level” peer reviewed international journals, especially in STEM). A high-level of uncertainty prevails for postdoctoral researchers coupled with numerous short-term, non-permanent research and teaching contracts. In this non-permanent “floating” body, postdocs are not recognised as official employees with equal social and financial benefits. In this Type, well established full professors wield vast power; faculties are male-dominated. Moreover, these male mentors are powerful gatekeepers to networks, opening the succession to male junior colleagues, a feature their female peers lack. This points to a Mandarin Type organisation. Of course, international mobility is highlighted, while the institution remains relatively closed in terms of local recruitment for postdoctoral contracts and permanent positions. In fact, the institution is discursively engaged in internationalisation in terms of

economic measures and standards, particularly because there is less overall funding for research by governments. Hence this institution tries to encourage international funding.

As to career paths, the linear pathway is marked by long waiting periods in professional situations of statutory and economic precarity, where short-term projects are accumulated, and contribute to teaching and administrative tasks lacking any institutional recognition, but which manifest an alliance to a particular professor or centre. Women live in a particular parental and career ambivalence, with little social service support fostering work/life reconciliation. Professional reconversion is difficult due to a market less inclined to accept PhD holders. Once embarked on a scientific career, you need to persevere in that sector.

This Type combines a large range and high amount of costs at different levels. The individual level is characterised by high professional insecurity, non-integration and institutional non-stabilisation. Institutional membership is not extended to early career researchers, and it brings with it several repercussions on the institutional level as well as for the larger scientific community. The numerous short-term contracts employ quite a large non-stabilised labour force, dedicated to fundamental research. However, the institution structures fundamental research in a short-term and non-continuous way. As individuals are, moreover, self-reliant, with less assistance in terms of supervisors and colleagues, fundamental research remains a rather haphazard affair, at the mercy of funding opportunities. Moreover, a significant feature of this Type is the high cost level in terms of teaching: the teaching task is perceived as ungratifying by individual, early career researchers, despite an increasing number of assistants in insecure roles. Barely recognised, they assume teaching tasks, although in requirements for permanent positions there remains a focus on publications and research development. Teaching therefore is assumed by an undervalued teaching force, which is not very motivated by the teaching task. Arguably, this is rather unfavourable for teaching itself, which remains a secondary task compared to research that is over-valued due to recruitment criteria and to the forms of the PhD and postdoctoral projects and short-term contracts. Teaching is moreover classified as a sticky floor, favouring neither the scientific nor the institutional levels.

In terms of gender dynamics, this Type continues to have a very thick glass ceiling, meaning slow career progression for women, coupled with masculine cooptation logics and non-existent support in terms of supervision and networks for women. In parallel, there is a work/family conflict, penalising workers with families. High demands and non-flexibility of working conditions and careers, coupled with hyper-productivity as a recruitment criteria and institutional omnipresence make work/private life conciliations next to impossible. Moreover, this kind of organisation does not take the lack of childcare and family services in society into account and fails to provide any services on its own. On the whole, women who are mothers or who wish to be mothers have a particularly hard time; the latter often renounce parenthood, given the impossibilities of career conciliations. Career and professional assistance for development is often not

given. The scientific and institutional community should ask itself what kinds of worker profiles it wants to promote. Currently, the worker profile that is promoted is rather homogeneous, linear and mono-profile, orientated towards an omnipresent, outdated masculine profile. The research institution can ask itself whether science itself will stagnate through its persistent promotion of the types of researchers/academics it is now represented by. For the institution and the scientific community's missions and output, these questions are intimately linked to workers' positions, conditions and degrees of membership, and how work gets assigned and done. Here we find a particularly greedy institution, which, moreover, does not offer membership to a large floating body of workers, working on fundamental research developments and teaching.

When looking at gendered impacts, early career women researchers and academics pay high prices; they have a particularly hard time becoming stabilised and risk accumulating short-term contracts, and if they are in permanent posts, they tend to be more on assistantship teaching levels. Teaching is, however, considered less gratifying, and so presents them with a sticky floor, preventing them from doing research. However, the kind of research that they are required to do is for CV enhancement, and focused on productivity criteria (publications) as a discursive resource. Moreover, in this kind of institution, a high level of importance is given to guidance from mentors, especially on the strategic level, and for access to networks, which are significant for accessing career opportunities. Informal recruitment criteria moreover are not that visible and the processes themselves are non-transparent, especially for women who lack mentors to give them appropriate advice/institutional knowledge. The insecurity and instability of their job situations lead to anxiety and burnouts are frequent. When in stable positions, they experience overwork too. If they are not in assistantship positions, they experience a lack of social infrastructure and institutional embeddedness (membership). For women, persisting along precarious career paths often leads to sacrifices on the level of family choices, preferring to defer or renounce motherhood to progress in their careers. In terms of opportunities to use their PhDs and careers in other sectors, the SSH women lose out especially, because their PhDs are not easily recognised in other sectors. In STEM things are somewhat easier. Thus, even the avenue of professional reconversion is arduous and not that wide. In sum, they are in a very precarious overall situation, with a high degree of gender inequality for early career female researchers/academics, compared to their male peers, although early career men too generally have a hard time acquiring permanent positions. However, they are more equipped for gaining access and availing themselves of promotion opportunities, and sacrifice less on a personal level.

Continuing in ambivalent career paths in “Missionary” university institutions, with moderate costs: Type (2)

The second Type of university and/or research centre sees itself as an institution within society, and envisages its teaching, research and community servicing

missions in that context. It centralises its power but delegates daily management to its faculties and research institutes. However, every strategic decision involving local actors is taken with the central powers' approval, in order to ensure the institution's missionary coherence. This institution may be classified as a professional bureaucracy with less support for teaching and research units and more for central governance (commissions/committees). It is characterised by a high level of self-management on the part of each unit and individual academic/researcher. The huge amount of administrative work is time consuming and, for early career researchers, represents a sticky floor linked to performing non-prestigious tasks. Nevertheless, the recruitment of academics is based on the double reference of being internally renowned in terms of research, but also of having a loyal disposition locally – to be of service to the institution. Attuned to social norms, gender equality is proclaimed but seldom practiced.

In terms of context, the labour market has achieved much in terms of feminine employment, but with the dual-breadwinner/female carer model in ascendancy. Here we may find a part-time feature of female employment, also implying a hidden one-and-a-half breadwinner model (full-time male/part-time female work by couples). An unexplained moderate gender gap also persists. The social security system is universally protective (good social benefits) and the conditions of employment are well regulated (minimum wage, job protection), with those conditions replicated in academia. The social system here also includes a quite developed childcare service and family leave arrangements (short, flexible paid parental leaves for instance). However, for academia, the organisation of work is non family-friendly for all that, with overwork, productivist recruitment criteria, and a solicited commitment to voluntarism in and for the university institution.

In terms of careers, this pathway entails a double engagement: a research engagement ensuring international recognition, and an intra-institution engagement to be disposed to contributing to the common good of realising its missions. Those engagements may be fulfilled in a privileged way in positions which offer good working conditions, but with no long term guarantee of work continuity or stability. In order to obtain a permanent position, two strategies are valued: meeting standards of scientific excellence, but without, however, neglecting the other two missions; the second involves excellence in teaching assignments and community service, without neglecting the quality of research. In the two cases, the young researcher has to be able to count on his/her peers and seniors in order to gain support in accomplishing those various missions.

The social context is supportive of work/life reconciliation, and the working conditions being good, young researchers do not hesitate in founding a family and entering parenthood. However, they live with a significant degree of tension between their institutional and parental engagements. Women, especially, experience a general ambivalence, not knowing where to situate their life priorities. There is a lot of discourse about gender and equality policy and laws, existing on national levels, as well as sometimes on research institution levels, yet without concrete plans being implemented. There is some institutional resistance to implementing gender policy and measures; notably an ambiguous discourse

about gender and recruitment processes, or about quotas on recruitment committees and in leadership, or on whether any gender bias exists, mostly in STEM. Gender stereotypes persist despite a pronounced feminisation of higher education: STEM still remains predominately male. There is a bottleneck after PhDs and during or after postdocs, with few permanent positions and high competition. There are persistent glass ceilings, especially for leadership and management positions.

If we look at work culture and organisation, co-optation logics exist, maintained by mostly male gatekeepers; hence “following” a mentor is more possible for men, which points to mobilising masculinities. There are fewer female “role models” and less support from gatekeepers for women. Early career women researchers/academics are more fraught with guilt over juggling working life and family life than their male counterparts. There is, however, overall in this Type, a clear parental ambivalence (not entirely comfortable with work/family balances and a harder time for parents), for both women (more so) and men. This Type highlights a precarious and ambivalent balance that is achieved, or not achieved, for women and men in early career stages, to a high degree dependent on their respective partners. Unlike their female colleagues, male early career researchers and academics often have partners with part-time or no work, and who take on the primary carer role in their family.

In recruitment processes and structures, there are tensions between competition-based (publications, mobility) and nomination-based criteria (finding the ideal candidate who “fits”, will be loyal to the institution and who will be a nice future colleague). The former, competition-based criteria, are major discursive resources for early career researchers, whereas the latter tend to be discursive resources for recruitment committee members. These latter nomination-based criteria are however less transparent and more likely to be taken into consideration if applicants have local institutional knowledge, and are integrated into local networks. International mobility is a significant asset for gaining permanent positions: early career researchers try as much as possible to complete doctorates or postdocs abroad, as this is seen as a clear criterion for applications, but without breaking the link with the (home-)institution. In other words, the institutional emphasis on internationalisation, excellence (high research production and funding) and competition discourse is in tension with a locally, highly developed organisational and (negotiation) “culture”.

A constant bid for funding characterises this Type; individual early career researchers, such as postdocs, and early career tenured academics and research centres, as well as all the research institutions are bidding for governmental and international funding. This governmental bidding is sustained by a “point-system” (awarding centres or individuals according to the amount of research produced or funding obtained externally) or a “closed envelope system” (universities receive funding according to the number of students but with a constant global amount divided between universities): these systems reinforce a competitive culture, for units and between individuals. A lot of time is dedicated to writing funding applications. There is a clear gender budgeting issue with these

systems, as STEM receives more per student funding than SSH. Yet, at the same time, SSH has a higher student to teacher ratio. Due to the asymmetry in the gender distribution between the two sectors, women have less access to funding: indeed, they are overrepresented in SSH, the sector losing out on funding possibilities, while in STEM they are in a minority.

In this Type of organisation, omnipresence is a key notion: junior and senior researchers have to do everything and be everywhere, in all meetings, at the same time. Their work is characterised by a double-edged flexibility; they love doing research, sometimes less so teaching, but they feel that this passion-driven work, and the flexibility of being at work any and everywhere may infringe on private and family life. Their problem is “hitting the off button”. This Type is characterised by many early career researchers and newly tenured taking the working conditions and nature of work, and personal sacrifices in their stride; “it’s normal for this kind of career”. PhD reconversion into other sectors is not easy for SSH in terms of value, salary, job satisfaction and opportunities. It is easier in STEM, especially for male leavers. However, not on the salary level: engineers are not paid more due to having PhDs. So a PhD is often unrecognised on salary scales in STEM.

In terms of cost rationale, in this Type the moderate costs are evenly distributed while heavier in the macro science level, but some weight is born by university missions and pillars. The institutional context is moreover based on some financially constraining frameworks reinforcing certain trends. The growth in student numbers is strengthened by a governmental funding system(s) that create(s) competition between universities and research institutions in order to “bid” for funding. Student numbers are deemed indicators for greater or lesser funding allocations. However, there are also fewer teaching staff and fewer academic positions for PhDs/postdocs to take up, and the conversion value of the PhD in certain fields like SSH is low. So there are more PhDs/postdocs in short-term contracts developing fundamental research and teaching, but also a lesser continuity in the careers and in professional development and contributions to university environments. Professional development is more markedly a point that remains moot in terms of a PhD’s value: what are the possibilities for the PhDs offered at university and research institutions beyond academia? Why do institutions hire many PhDs and postdocs, possibly for funding reasons and the development of fundamental research and cheap teaching staff, but what is the continuity in terms of professions?

Additionally, the funding system between STEM and SSH (and other) fields is disproportionate. STEM has more funding, but fewer women, whereas SSH has less funding and more women. The gender stereotypes already existing in postgraduate education in fields are thus strengthened further along the career. Generally, the organisational system(s) tends to reinforce a competitive rather than a collaborative culture. Workers (researchers/academics) have a hard time integrating into and creating their research teams, especially early career women. In conjunction with this, the organisational system adopts a logic of self-management of units, with an administrative system that supports central

governance, rather than research, teaching units and individuals. Fulfilling all the different missions and tasks becomes arduous for workers and units, and requires a high level of self-reliance, while university assistance is hard to come by, and collaboration between colleagues more difficult. Workers struggle to keep up with the workload, the omnipresence and strain of self-management, and getting help where it is given (mentors, supervisors, colleagues); women are more likely to lose out on these fronts.

The university and research institution might well ask itself if this kind of culture and organisational system is likely to create a worker-friendly environment, or a more collaborative and community-based culture. The scientific community, moreover, emphasises that science is primarily collaborative work, and recruitment criteria for committees are also focused on the importance of local integration and the ability to collaborate; the institution needs to ask itself whether this criteria requirement is respected in such an institutional environment, and whether or not the system itself also needs to offer structures fostering integration and collaboration.

In terms of gendered impacts, early career researchers and academics, both women and men in this case, have to maintain a precarious balance in order to gain access to careers, and then to progress in those careers. However, this balancing is more difficult to achieve for women compared to their male counterparts. There is the importance of gatekeepers, mentors and belonging to the right kind of networks, whether they be international or local institutional networks; women have less access to networks and get less advice from their supervisors, who are often a far cry from mentors. SSH men have more access to mentors within the institutional framework, whereas STEM men rely less on mentors and are more solo players. STEM and SSH postdoc and newly tenured women have more internationally based mentors. However, this presupposes having international networks.

The kind of recruitment criteria highlighted are two-fold as well, and present a kind of rock and a hard place for women; productivity-based criteria, such as publications in the right kind of journals and in STEM are also numbers and indicator-based. Here, mobility is also a criterion for “excellence” in a CV or application file: early career researchers try as much as possible to do PhDs, or more often postdocs, abroad. Or else, they come from neighbouring countries and hence demonstrate mobility. An element too is the high institutional significance in this Type of local institutional knowledge of codes, of what is expected by committee members and “locals” about how to “fit in”; this knowledge can, again, be, as in Type (1), gained by belonging to local networks and being guided by mentors, which women lack as compared to their male peers.

Women have a harder time achieving both types of criteria, as doing so may interfere with family life or motherhood, as frequently happens to postdoc or newly tenured SSH women. STEM women postdocs tend to not yet have children, and wait to be newly tenured to have them. Again, the pendulum may swing towards a permanent position if all the configurations are “right”; if you have a supportive supervisor, if you have a supportive private partner in life,

who takes on family responsibilities, if you can work overtime and invest sufficiently in achieving productivity and being omnipresent (research production, funding, teaching, institutional engagement, administrative tasks). However, the chances that all of these configurations are simultaneously favourable are quite slim for women. It is easier for men to align. Professional reconversion is not something women accomplish easily, as they have more regrets about leaving academia and a lingering sense of failure, despite having found work in other sectors, whereas men describe taking a personal distance from academia, and so voice more satisfaction.

This Type (2) leads to a high level of role ambiguity for women on the parenthood level too; upon becoming mothers, they have a harder time being hyper-productive and omnipresent, and experience more guilt about work and family conflicts, whatever they do. Male parents voice ambiguities too, but they have more support elsewhere, with partners largely assuming care and household chores, and flexibility in terms of mobility for example. They also have more mentors and institutional assistance from networks, they revel in the flexibility their type of research work offers and do not feel guilty about work/family conflicts. So both more role ambiguity and more difficulty in achieving even a precarious balance, with the need for the “right” configurations, characterise this Type in terms of women’s gender inequality.

Striving to win in competitive career paths in “Entrepreneurial” organisations, with specific costs: Type (3)

The third Type of university and/or research centre clearly defines itself as an enterprise in a competitive international market. Competition is thus an integral part of its functioning. A clear objective is progressing in international rankings. The organisation is adhocratic as it needs to adjust its rules depending on its competitors. The recruitment criteria chiefly focus on maintaining internationally excellent standards, with regard to which researchers and academics are regularly challenged in formal evaluations. The organisation provides itself the means to those ambitions by funding the “most promising” of its researchers. The recruitment criteria focus mainly on maintaining internationally recognised standards in terms of which researchers and academics are regularly subjected to formal evaluations. It hopes to attain and maintain those standards by funnelling funding to the “most promising” recruitment criteria aligned towards the referential of competition, looking for those with the highest international reputation. The local culture is not neglected, as talents may be stimulated. This translates itself into a gender policy focused on selecting the “most talented women”, in screening and bringing them into a coaching logic designed to support their careers through the excellent results obtained.

The career is cumulative but based on an elitist conception. Those taking this career path have to narrow their career choices, as the external market is sufficiently elastic and open to highly qualified professionals. Recruitment and promotion criteria are quite explicit and aligned to playing an international

competition game, particularly through high-ranking peer reviewed journal publications. Everyone seems free to choose to play this game. Despite what appears to be a free market choice, this particular freedom of choosing an academic career also means that you have to be able to juggle between multiple engagements.

This Type is also characterised by modified male breadwinner gender regimes or “one-and-a-half earner models”, where the female part-time character of work is frequent in its overall labour market. But a striking difference to the part-time national trend is to be found in academia, where women employed full-time are predominant. Childcare services are available, but very expensive and exclusive (few children per service, few services). Compared to men, women are still primarily responsible for and spend more time on childcare and domestic work. Despite a family culture of mothers caring for children, the use of formal childcare has increased rapidly. Gender stereotypes persist, favouring STEM men. The higher we climb, the thicker the glass ceiling, especially as to full professorships and management positions. There are still few women in leadership positions, although marginally present in all levels and posts. There is a particularly narrow bottleneck, with very few permanent positions and few chances of attaining stability. However, there is also a highly buoyant extra-academic labour market PhDs avail themselves of, including in SSH.

There is a strong national gender policy discourse and softer governance is opted for through quota introductions, rather than through structural and cultural changes. The academic institutions have some policies on gender too, although mostly in terms of an overall HR diversity policy. There are elaborate mentoring programmes already in place, with peer mentoring and promotion of women in science; wide-ranging and relatively well-funded equal opportunity measures are available, especially at the doctoral level. This is less the case for the postdoctoral level, which still remains institutionally invisible in terms of an employee body. However, these measures are geared towards “coaching champions”, or selecting the most “excellent” or best researchers. Competition for these funding possibilities is higher.

In terms of work/life interference, there are still fewer children among women in academia and a clear parental ambivalence for women, while lesser for men. There are however big differences between STEM and SSH in terms of parenthood, with “STEMs” often not having children.

Looking at work culture and organisation, in this Type, early career researchers and academics must “self-drive” their work, like a business man or woman. They have to juggle different tasks once they are tenured, which is experienced as being problematic and infringes upon work/family and private life balances.

While early career researchers and academics assume a “take it in your stride” attitude, both men and women, and women especially, feel the sacrifices, instability and overwork. There is a clear tension between work and care. Early career researchers/academic women mirror society’s persistent assignment of the major carer role to women. Of course, the intensity of the tension surrounding work–life balances strongly depend on gender-role arrangements with partners.

In this Type there emerges the idea of the idealised “all-round” academic profile, which is thought to be well suited to an increasingly international and competitive environment. This ideal-type figure is expected to “perform” equally well in research (by attracting competitive external funding – notably to keep postdocs in employment – and publishing in the top international, peer-reviewed journals), in teaching (by attracting high-quality graduate students), and in maintaining high levels of organisational wellbeing (particularly by taking on administrative duties). In addition, this (imaginary) figure of academic equilibrium should know how to accommodate non-academic activities (leisure, sports, culture, and even family life ...).

This Type of organisation is characterised by hosting an important influx of international students. While there are many postdoc contracts with international or external funding, they do not, however, necessarily lead to tenure-track or permanent academic positions. When it comes to obtaining permanent positions, the locally funded career pathways are still more favourable compared to incoming international postdocs. Despite being embedded in the international market, the university is not seen as attractive for employment for locals, although being strongly embedded regionally. While an increasing number of short-term contracts and non-tenured assistant professor positions exist, that is not the case for associate and full professors; we are already looking at a glass ceiling at the associate level. There are many lonely heroes and heroines, with numerous boys’ clubs, some more recent girls’ clubs, and some women mentors promoting women.

For early career researchers and newly tenured academics there is a constant bid for funding, for research and the advancement of networks and strategic guidance, which is considered quite key in career advancement. Postdocs tend to focus upon research and CV building, whereas teaching is seen as a necessity or obligation for tenure, or once tenured for promotion towards professorship.

The selection processes are governed with formal criteria due to gender equality policy, however those formalised criteria focus on initially quantifiable research, then “subjective” factors that are non-transparent, such as “all-round” or “ideal-type” academics. Quota or excellence-based equality measures strengthen competition, and may reinforce a market-driven logic of academic recruitment.

In terms of cost rationale, in this Type of career path and organisation, specific costs are incurred on all three levels, whereby the scientific community suffers too in terms of the persistence of gender stereotypes in (STEM/SSH) fields. In terms of fundamental research, it too is governed by funding competition and remains haphazard. The specificity of this Type also lies in a very stringent, steep and slow career progression in a very elite organisation. Jobs are very hard to come by, because they require the profile of an “all-round” ideal academic who is capable of self-management, institutional embeddedness and excellence at all tasks (research, teaching, service to the institution, society).

PhD conversion is somewhat better in the non-academic sectors. However, a career here is made possible when a whole set of conditions are met; when you

have supportive mentors, when you are in the right networks, when you have a supportive partner working half-time and assuming the primary care role. There is some institutional support as required in pre-existing gender policy and programmes, but they are still very elitist, exclusive and “excellence” based, focusing on requirements such as hyper-productivity, publication lists in international peer reviewed journals, as well as the existence of and membership in internal and external networks.

Looking at gendered impacts, early career women researchers and academics have a harder time juggling many things at the same time than their male counterparts; as in Type (2), an equilibrium between work and family life is very difficult to achieve, with overwork and “omnipresence”. However, there is less ambiguity on the individual level, except regarding parenthood. There are however, even fewer job opportunities in this Type, because there are fewer positions and very few chances of obtaining them. The extra-academic labour market however seems to be buoyant, but PhD recognition in other sectors is possibly less transparent for early career researchers. Although there are developed institutional mentoring programmes and financial measures to assist women in science, they have pronounced productivity criteria, reinforcing competition and reinforcing hyper-productivity: women still have a harder time coping with this, due to a lack of assistance, due to persistent traditional gender role assigning and assuming main carer roles. A self-driven and self-imposed masculine habitus of being totally engaged, is coupled with a double-edged flexibility allowing for a “work all the time and everywhere” atmosphere where work/life imbalances reign, and even more so for women. Their male counterparts often have partners working part-time and assuming main carer roles. For newly tenured females, as in Type (2), they maintain a precarious balance, depending on the presence of a supportive partner and/or a supportive private network (parents looking after children, etc.), as child care services are very expensive and hard to come by, coupled with an institutional supportive network accessed by important gatekeepers/mentors. However, all that is a quite rare configuration for women as there are powerful cooptation logics and old boys’ clubs. Thus the overall balance is very hard to maintain the higher the career ladder you climb; overwork becomes increasingly pronounced the higher the positions (professorships and management). In terms of gender inequality, women have a hard time accessing and winning in a stringent, competition-based system, fostering an elitist institution and career, and then, in maintaining that highly demanding position, compared to their male peers, who have more set configurations over a long-term period.

Discussion and perspectives

The analytical approach of inducing a typology of gendered pipelines from real country and institutional cases, and looking at the level and range of costs that these three ideal-types assemble on three different entity levels (science/institution/individual worker) has allowed us to re-orientate the more classic vision of leaky

pipelines. We have identified a common foundation of interrelated phenomena across all case studies. More importantly, however, we have shown that these common interrelated phenomena appear despite, or because of, specific contextual, organisational and configurational compositions. What we can discern is that this composition is quite significant in identifying the level and range of costs that leaky pipelines can incur upon the three entity levels. Importantly, there are clear indications that institutions can counteract to reduce these cumulative and specific costs, and that they must take their share in responsibilities regarding career opportunities and what becomes more significant, the organisation of work.

On the individual level, we can identify how in Type (1), for instance, women are in a very precarious overall situation, fraught with high risks and precipices, if they are to continue upon that linear career path, with high personal costs incurred (health, maternity, professional development, stabilisation, recognition) and fewer possibilities and opportunities for rebounding or breaking the fall. We can speak about a high degree of gender inequality for early career women researchers/academics, compared to their male peers. What this analysis has shown by looking at costs upon the three levels of the entities is that this gender inequality impacts on the macro level of science as much as on the institution it is based in. On the level of science as a collaborative, collective work and product of an organisation, we can see repercussions that have a significant impact upon the balance that arguably needs to be achieved between the key underlying priorities, missives and motivations of “responsible” science (Despret and Stengers 2011; Fassa 2013). For example, important scientific exchanges and development between teaching and research may suffer, as teaching is undervalued both on institutional levels and on the individual researcher level. The sticky floor of teaching experienced and lived by mainly female early career researchers in short-term contracts and assistantship positions, which are not remunerated similarly nor institutionally recognised as full academic posts, does not allow for teaching to have the same value, either institutionally or professionally (making sense of ones’ work as meaningful and recognised), and as a consequence may become side-tracked, undervalued and decoupled from research, which in its turn is focused upon hyper-productivity and career orientation. This is also the case for Types (2) and (3). This devaluing of teaching is, moreover, parallel to a rising number of students in these very same institutions, where per student teacher ratios are lower. This means that on the institutional level, there is a bid for students, without any real thought being given to the teaching body and its stabilisation, motivation, assistance and formation, etc. This decoupled way of organising teaching and research may therefore have important consequences. There is also an increase in short-term research and knowledge production with the rise of short-term research contracts, fraught with limits in the time dedicated to fundamental research, and coupled with lower governmental funding of fundamental research. Early career researchers and academics also spend precious time bidding for external funding, making the competition more stringent between them, but also leaving less time for developing research work. This arguably reduces the depth of research

undertaken, as researchers/academics juggle with more and more deadlines and hyper-productivity in terms of publications. The limits to research time affect the quality of research outputs and the type of knowledge elaborated in academia.

In all three Types of gendered pipeline, we witness a growing number of non-stabilised, “floating”, largely unintegrated, unrecognised, research bodies and assistantship teaching staff, with diminished social and pension schemes in Type (1). For science, and the institution as whole, to benefit from a collaborative, satisfied – as meaningfully recognised – working body, it is important to include and recognise short-term employees, as well as permanent assistantship employees. Institutions would therefore benefit from envisaging greater recognition of doctoral and postdoctoral researchers, as well as assistants, that recognition being multi-faceted in the way of institutional membership, professional development, remuneration, status, social and pension schemes as well as integration/participation on unit levels (centres, universities).

As things stand, we are looking at less diversity in research and teaching in terms of gender, with fewer female role models, and the overall persistence of masculine-based scientific research work models, despite the feminisation of higher education across all three Types. The institutions should ask themselves whether or not that model really mirrors the kind and form of scientific knowledge they are producing. In Type (3), research and teaching will go on being produced by an elite, more homogenous group of researchers/academics, perpetuating the Ivory Tower effect. In all three Types, we can also speak of brain drain from academia to other sectors, because although there has been a feminising of higher education, there remain few career chances in academia and also simultaneously little conversion of PhDs in SSH sectors outside of academia in the Type (1) labour market. In Types (2) and (3), the extra-academic labour market is more open to both male and female, highly skilled workers but with no real PhD recognition. That raises questions about a decrease in the purpose and value of the PhD. Those same institutions are accepting many doctoral and postdoctoral researchers, but why? Moreover, the persistent gender stereotyping in STEM and SSH in all three Types continues to raise questions. Institutions, research and teaching units could benefit by rethinking the purposes of their degrees, their doctoral and postdoctoral appointments, with more responsible and long-term vision in making choices, promoting, fostering and strategically guiding.

Type (1) institutions and scientific communities are arguably contributing to producing a contradiction between work and family, as women struggle to maintain family and careers, more often renouncing parenthood than men. This is paired with no effective childcare and elderly support system in society at large: which is not taken into consideration on the institutional level. In Types (2) and (3), we can see the appearance of parental ambiguity, with women having a harder time maintaining a balance, with a high-level dependence on the “right configurations”, and feelings of guilt at and off work. The higher we climb, the thicker the glass ceiling, which persists in all three Types, showing how “maintaining a balance” depends on a high incidence of favourable configurations

– very hard to come by for women, making progressing in the career as arduous as entering it, especially for professorships, full professorships or management and leadership positions. We can ask ourselves, do research institutions want to contribute to this work logic, reinforcing certain types of profiles based on masculine models, and to a logic of work over care? In their collective plea for slow scholarship, Mountz *et al.* (2015) show that “care work is work”. They explain how systematically marginalising care “furthers the myth that our successes are achieved as autonomous individuals and, as such, we have no responsibility to share the fruits of our success with others or to dedicate public resources to the work of care” (Lawson 2007, p. 5, in Mountz *et al.* 2015, p. 1238). Care can therefore be part of, instead of being alien to, the work ethics, logics and organisation of institutions. Care demands, conditions, times and nature should be taken into consideration by institutional regulation in the same way as work demands, conditions, times and nature, in unit philosophies, in recruitment criteria and in processes.

For all these Types, globally we can see the high incidence of funding systems on gender inequality, and for all three entity levels. Due to the funding systems (by points, or closed envelope systems), students are attracted due to bids for governmental funding, which reinforces a “competition over collaboration” culture between entities and between individuals. We can also say that scientific production is governed by funding structures. One avenue for institutions and entities (teaching and research) to counteract being governed by funding is to reduce the competition-based culture and work orientations, and instead strengthen collaborative work and bidding for funds. Entities should be more collective in sharing their knowledge amongst themselves, in looking for ways to promote research, and in looking for ways to move forward collectively in developing their research. This would arguably make for fewer lonely heroes and heroines, and also avoid replications, disjointedness and dispersions of funding applications within and between centres and other entities.

One major element that plays strongly in creating costs on all three levels are the gaps between formal and informal criteria, not in terms of their existence, but in terms of tensions between visibility, clarity, demands, discursive resources and making sense of work. In all three Types, there exists an institutional ambivalence and discrepancy over what might be called formal, or competition-based, or internationally orientated criteria, versus informal, subjective, local nomination-based or integration-based criteria for nominations during recruitment procedures. The struggle for women in this is balancing between a rock and a hard place, because the formal criteria are often hyper-productivity (high-ranking, numerous publications) and mobility based, which are difficult for women to comply with during childbearing and rearing years. Moreover, they are difficult because authorship possibilities are linked to publication systems, which are themselves often intimately linked to network access, both of which are reduced for female early career researchers. The second Type of criteria that are more local or institutional are strongly linked to access to institutional knowledge, codes, networks (both national and international) and gatekeepers/

mentors. This again is a configuration that is less often developed by women early career researchers, as we are also looking at the existence of cooptation logics, fewer female role models and mentors, less support. For career progression, moreover, we cannot minimise the importance of local embeddedness and overall institutional (all-round academic) involvement, an “omnipresence” that is harder for women, except, again, with the “right” configurations coming together (both institutional support and private support).

Here the importance of a two-fold process concerning institutions can be addressed: the importance of rethinking criteria, and of rendering the local criteria clearer, more visible and recognisable, and of rendering the formal criteria more sensitive to the counter effects of hyper-productivity and mobility demands. In addition, it becomes important to reconsider the side effects of already existing gender equality measures, such as funding possibilities or mentoring programmes, which are still recruiting “excellence” that is based on hyper-productivity and availability, and to become aware that that reinforces a competition culture as opposed to a more work-healthy collaborative culture. In general, the kind of work culture and organisation that can be rethought in favour of work rhythms and a philosophy that makes sense to its employees. Mountz *et al.* (2015) describe how their plea to slow down aims to undo some of the consequences of the frenetic pace at which many of us live our lives. According to Honoré (2005), “Fast and Slow do more than just describe a rate of change” rather, they are “ways of being, or philosophies of life ... It is about making real and meaningful connections – with people, culture, work, food, everything. The paradox is that Slow does not always mean slow” (Honoré 2005, pp. 14–15). Hartman and Darab (2012) call for slow scholarship as a response to the acceleration of academic work, discussing in particular the implications of this intensification for pedagogy. They frame intellectual freedom as the “freedom to think” (Hartman and Darab 2012, p. 53), a re-conceptualisation that they note requires the space, time and other resources curtailed by the escalation of corporate approaches to teaching and university management. Mountz *et al.* (2015) suggest that by slowing down – to listen and read what others have to say, to expand our experiences by getting out of offices and classrooms – we can do our best scholarship, teaching and mentoring.

Conclusion

The relationship between the precarious situation of researchers and the features of gendered organisations contributes to producing and reproducing inequalities between men and women in terms of access to, and maintenance and success in, scientific and academic careers. None of the case institutions studied leaks: phenomena related to leaky pipelines for women are clearly identifiable. However, while doing a meta-analysis of all the data studied, as we look more closely at the social and institutional contexts, at organisational dynamics and the experiences of researchers, we discover that not all the “pipelines” are entirely similar. Using the Weberian approach to ideal-types, we have isolated

three Types of “gendered pipelines” based on a meta-analysis of six case studies across six European countries: a first Type that translates as persisting in precarious career paths in “Mandarin” organisations, with high cumulative costs; a second as continuing in ambivalent career paths in “Missionary” university institutions, with moderate costs; and a third as striving to win in competitive career paths in “Entrepreneurial” organisations, with specific costs.

The idea of these three Types of career paths, organisations and experiences, with various cost configurations, should allow specific research institutions to situate themselves, in order to determine what all of this means in terms of their own leaky pipeline situations, the three entity levels and their relationships to them, and what costs are at stake. Le Feuvre (2015) underlines how important it is for institutions to clearly define the model of feminisation they want to promote in academia, since different typological processes can have contrasting effects on the degree to which the existing gender system is reproduced, reconfigured or transformed. This typology can assist institutions and individuals in determining gender policies and taking measures that are not unidimensional.

Note

- 1 E.g. A massification of students and feminisation in higher education, with exceptions in STEM; a bottleneck variously narrowing at slightly different points after PhDs or during/after postdocs; tensions as to the value, purpose and status of the doc/postdoc on the labour market; a “ratchet effect” once you obtain the doctoral degree (diploma) and a tenured position; a perceived sticky floor on the level of teaching; a work/family conflict, etc.

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