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Abstract

Damages for personal injuries is a field prone to gender biases. Empirical exploration of the issue, however, is far from being simple, especially in Civil Law countries, given a pervasive lack of transparency and explicitness on the details of reasoning and treatment of numerical values. Accounting for that feature, our research sketches a canon of analysis that goes beyond the words. To deal with risks of cherry picking and inaccurate sample design, our database encompasses all the decisions made during the span time selected (more than 20,000) by an Appellate Court. Scrapers designed ad hoc have been instrumental to that aim.

In our case study, the well-known earnings gap, usually assumed a cause of other, second order gaps, ought not to be mirrored in magnitude by pecuniary damages, because the “shadow price” of non-remunerated activities must be computed together with earnings lost, what should counterbalance the latter derivative gap. Non-pecuniary damages, in turn, must be independent of earnings, being theoretically free from that effect. Nonetheless, we found differences with statistical significance in any of them, in favor of men. Some reverse engineering in search of the primary source of the gap leads to find a systematic bias in percentages of disability against women, even in cases where the predictable result should be the opposite.

In more general terms, the said obscurity on the treatment of numerical values, usually covered by rhetoric, renders difficult any honest scrutiny of systematic biases on the matter without the assistance of high technology and some sophistication, and shields decisions to criticism. Accordingly, it helps perpetuate gaps whenever existed.

Sumario

La indemnización por lesiones personales es un campo propenso a los sesgos de género. Sin embargo, la exploración empírica tendiente a demostrarlo está lejos de ser sencilla, especialmente la que tiene por objeto sentencias de países de derecho civil, dada la generalizada falta de transparencia y claridad en los detalles del razonamiento y el tratamiento de los valores numéricos implicados.

Teniendo en cuenta esa característica, nuestra investigación esboza un canon de análisis que procura ir más allá de las palabras. Para hacer frente a los riesgos de selección parcial y diseño de muestra inexacto, nuestra base de datos abarca la totalidad de las sentencias emitidas, durante el lapso elegido (más de 20 000), por el Tribunal de Apelaciones más relevante de un sistema judicial nacional del civil law. Los web scrapers diseñados ad hoc han sido fundamentales para su análisis.

En nuestro caso de estudio, la conocida brecha de ingresos —generalmente asumida como causa de otros sesgos, de segundo orden, como los judiciales— no debería reflejarse pura y simplemente en la magnitud de la indemnización por daños materiales, porque el precio sombra de las actividades no remuneradas de la víctima (actividades domésticas, de cuidado, etc.), incluidas dentro de su capacidad, debería computarse junto con el puro lucro cesante y contrarrestarla. La indemnización por daños no patrimoniales, a su vez, debería ser independiente de la capacidad de ganancia monetaria explícita de la víctima, lo que la dejaría al margen de la brecha de ingresos. No deberían verse, aquí, diferencias en contra de las mujeres.

No obstante, aunque de acuerdo con lo expresado en palabras, sea por la doctrina autoral o en las mismas sentencias, no deberían existir, encontramos diferencias con significación estadística, en todos estos conceptos, a favor de los hombres. El empleo de una particular ingeniería inversa, en busca de la fuente primaria de la brecha en las determinaciones judiciales, encuentra un sesgo sistemático en los porcentajes de discapacidad otorgados, en contra de las mujeres, incluso en los casos en que el resultado, predeciblemente, debería ser el contrario.

En términos más generales, resulta sumamente relevante advertir que la oscuridad en el tratamiento de los valores numéricos, generalmente encubierta por la retórica, dificulta cualquier escrutinio honesto de los sesgos sistemáticos en la materia y que, sin la ayuda de alta tecnología y cierta sofisticación de análisis, “blinda” las decisiones a la crítica. En consecuencia, ayuda a perpetuar las tales brechas de género en las indemnizaciones al contribuir a la dificultad de comprobarlas.

Título: *Brecha de género e indemnización por lesiones personales: ingeniería inversa contra la opacidad judicial*

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Keywords: Law and Economics; Gender Gap; Personal injury compensation; Non-pecuniary damages; Web scraping.

Palabras clave: *Derecho y Economía; Brecha de género; Compensación por lesiones personales; Daños inmateriales; Web scraping.*

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1. Introduction. Theoretical remarks

Gender gap is the term usually employed to name a broad range of unequal results based on gender. Probably the most popular, in media and public agenda, is the so-called *earnings gap*, *pay gap* or *income gap*, denominations that allude to differences in remuneration due to gender. This bias might be regarded as the basic source of several other gaps. We call these derivative gaps “*second order gaps*”, i.e., disadvantages as social security differential benefits coming from the former. Gaps in damages awarded for personal injuries might be suspicious of being only a typical candidate of the second order ones.

However, in this field, unfair treatment might stem, indeed, from diverse sources. Firstly, from straightforward and explicit norms or principles, i.e., as if, according to scheduled damages or legal rules, differential amounts of compensations for the same kind of injury were awarded based on gender. Secondly, gaps may be the indirect result of some interaction between legal norms or doctrines and the real world, as when strategies to assess damages employ statistical data on factors unequally distributed among genders.

Thirdly, they may derive not strictly from norms or doctrines, but from the improper performance of courts and officials in applying them. In this case, some practices and systematic misapplications of the rules or principles, either deliberately or not¹, may lead to biases.

Nowadays, in Western countries, the first source of gaps is almost a bad memory of a bygone age. The second and third ones, on the contrary, may be serious issues in many of them. The third, in particular, turns out to be peculiarly hard to discover and solve.

Different national systems are prone to different weaknesses. Methodologies, rules, and procedures applied in different nations derive correlated differential risks on the matter. A survey of European countries’ law about only one category of the damages relevant to the field (*housekeeping capacity*) is enough to realize how scattered and nuanced the landscape in this field is².

It is far from our aim to endeavor a detailed comparative quest, although distinguishing a cleavage between *classes* of systems help to point out typical sources of potential biases. We may separate:

- Systems pursuing a case-by-case *restitutio in integrum*, i.e., aiming to restore the plaintiffs to the position they would have enjoyed but for the tort.
- Systems that replace traditional expert-driven damages calculations with scheduled damages using general multipliers and schedules³.

Both kinds of systems are vulnerable to gender biases, but the inquiry on the matter should account for peculiarities in each of them. If a legal schedule undervalues certain kind of damages, e.g., the alluded housekeeping capacity, this would, indirectly but visibly, impact far more on one gender than on the other⁴.

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¹ «...In this Article, bias includes both deliberate and unconscious disparities in the treatment of persons who are similarly situated, whether stemming from animus, hostility, insensitivity, lack of empathy, or the use of stereotypes or unfair generalizations about a group...». CHAMALLAS, «The architecture of bias: Deep structures in tort law», *University of Pennsylvania Law Review*, 146, 2, 1998, pp. 463-531. <https://doi.org/10.2307/3312624>.

² KARNER/OLIPHANT (eds.), *Loss of housekeeping capacity*, De Gruyter, 2012.

³ WARD/THORNTON (eds.), *Personal Injury and Wrongful Death Damages Calculations: Transatlantic Dialogue*, Emerald Books, 2009.

⁴ MARTÍN-CASALS, «Por una puesta al día del sistema de valoración del daño corporal (“baremo”)», *InDret Penal*, 4, 2012.

Its generality, however, gives it a communicative advantage. It allows such a factor, which harms an entire category of individual claims, to be easily exposed, criticized, and eventually fixed once and for all.

Restitutio in integrum systems, in turn, may incur in several flaws at a different level. Details on strategies of assessment (types of services admitted as housekeeping capacity, characterization as pecuniary or non-pecuniary of any feature of those services, *input* vs. *output* valuation, et cetera) determine a broad range of cases of study hard to compare⁵. Particularized assessment, in itself, makes it difficult to notice any instances of unfair treatment and, accordingly, to solve the problem.

Paralleling the previous example, if, beyond the role of experts, assessing housekeeping capacity and its valuation is ultimately a matter of judge's or jury's discretion, either under or overvaluation may occur case by case. Aside from their effects on each individual claim, this creates an improper variance, undermining the functions of the system⁶. At the same time, as far as our issue is concerned, discovering a systematic tendency across the entire universe of cases, i.e., a bias, would require costly and time-consuming efforts. Fixing the bias would be, in turn, harder.

General (scheduled damages) vs. *particular* (*restitutio in integrum*), perhaps, are not clear-cut defining factors, but nuanced features of real legal systems. For instance, to assess damages, *restitutio in integrum* systems usually account for statistical data. This strategy induces the pros and cons of generality in particular-oriented systems, as far as the choice of data pervades a whole class of individual cases.

«Reliance on race-based and gender-based economic data to determine lost earning capacity is bad social policy» has been told⁷. Some proposals to break the link between damages and gender-biased earnings data consist of avoiding gender as a reference class⁸. In practice, in rare cases in the US, gender-neutral income averages may be used depending on the profession the court predicts the plaintiff would have held⁹. Recently, a more drastic position claims for the usage of general agency *Statistical Value of Life* (VSL), instead of estimations of future earnings¹⁰.

On the bright side, resource to statistics, in turn, induces the advantages of generality (easy communication, less variance) in *restitutio in integrum* system as well. In contrast, judicial discretion plus no transparent reference to values and multipliers employed as references (if any) combines the disadvantages of both previous systems and none of their benefits.

The case *Carvalho Pinto de Sousa Morais v. Portugal*¹¹ shows up as an example of bad performance of judges and officials in applying the law in *restitutio in integrum* systems. In the case, Portuguese Administrative Supreme Court upheld the first-instance judgment on the merits but reduced the amount of damages awarded to the applicant. In SC reasoning, being the plaintiff a 50-year-old woman, the impact of the medical malpractice suffered on her sex life was less important than it would have been if she had been

⁵ TINARI, «Challenges in Valuing Loss of Services», in TINARI (ed.), *Forensic Economics. Assessing Personal Damages in Civil Litigation*, Palgrave Macmillan, New York, 2016, pp. 161-177.

⁶ Speaking of housekeeping capacity, WARD (WARD, «Differences Among Nations in Measuring Economic Damages» in TINARI (ed.), *Forensic Economics. Assessing Personal Damages in Civil Litigation*, Palgrave Macmillan, New York, 2016, pp. 305-316) quotes BERNSTEIN's incensed reproach «...By all reasonable measures, the American tort system is a disaster. It resembles a wealth-redistribution lottery more than an efficient system designed to compensate those injured by the wrongful actions of others» (BERNSTEIN, «Procedural tort reform: Lessons from other nations», *Regulation*, 19, 1, 1996, p. 71). The former would be a specific case of this broader criticism.

⁷ CHAMALLAS, «Questioning the Use of Race-Specific and Gender Specific Economic Data in Tort Litigation: A Constitutional Argument», *Fordham Law Review*, 63, 1994, p. 73. <https://ir.lawnet.fordham.edu/flr/vol63/iss1/6>.

⁸ GOODMAN, «For what it's worth: the role of race-and gender-based data in civil damages awards», *Vanderbilt Law Review*, 70, 2017, p. 1353. <https://scholarship.law.vanderbilt.edu/vlr/vol70/iss4/4>.

⁹ RENAUD, «Apples to Oranges: Gendered Damages in Personal Injury Litigation: A Focus on Infant Claims», *Alberta Law Review*, 56, 2018, p. 207.

¹⁰ SHARKEY, «Valuing Black and Female Lives: A Proposal for Incorporating Agency VSL into Tort Damages», *Notre Dame Law Review*, 96, 2020, p. 1479.

¹¹ *Carvalho Pinto De Sousa Morais v. Portugal*, judgment (merits and just satisfaction), 4th Section, ECHR, Case No. 17484/15, judgment date: 25 July 2017.

younger and had no children («...50 years old and had two children, that is, an age when sex is not as important as in younger years, its significance diminishing with age...»). In its judgement, the European Court of Human Rights (ECHR) compared the amounts adjudicated to the plaintiff with two cases of equivalent injuries caused for medical malpractice involving prostatectomy to male plaintiffs. At the end, the ruling of the Portuguese Court was deemed discriminatory and reversed.

Two features relevant to our goals arise from the case. Firstly, the explicit language of the Portuguese Court allows the European Court of Human Rights to infer discrimination and probably seals the fate of the judgment. Secondly, the limited comparison (one female vs. two male cases) carried out by the European Court is probably too narrow to conclude discrimination in every other case.

Our concern focuses on cases where discrimination may be present beyond the language employed, either in *restitutio in integrum* systems or any discretionary aspect of judicial assessment. A good part of the problem of unfair treatment does not involve judicial words as explicit and rough as those employed in the grounds for *Carvalho Pinto* judgement, but conclude in an equally unfair result. Vagueness, imprecision in describing the method of assessment, and conglomeration of separable categories of damages usually favor the perpetuation of discriminatory tendencies and cover them up.

Let us think, for example, of a case as common as a court of first instance adjudicating a female victim a global amount for PD of 100,000 €, remarking that the sum includes sub-categories of damages A, B, C... N (earning loss, housekeeping capacity, et cetera) with no negative reference to gender and even with positive remarks (e.g., invoking the decision has taken a gender perspective).

To conclude that such a judgment is biased or not, it would be needed much more than a comparison against two other judgments favoring male plaintiffs. Focusing only on total amounts of compensations is not enough to extract useful conclusions on the matter. Intuitions must face some fine-grained considerations: in actual case-law, not any disparity is an obvious gap caused by gender bias, nor every damage gap is merely a second order effect of earnings gap. Variance of circumstances, subcategories of damages adjudicated in each judgment, and a myriad of factors make the relevant comparison hard and costly, an put it outside the usual skills of lawyers. Nonetheless, some sort of “reverse engineering” can help to unveil some regularities. A treatment of that sort requires an analysis of judicial data combined with some exogenous information, all of them regarded in the light of idiosyncratic legal analysis. There is, however, a dearth of analysis of this sort, at least, in the Civil Law literature.

In our work, we employ the best technological and conceptual technologies available to explore gaps among a vast universe of case-law, beyond the words of the grounds for the judgement. The aim of research is dual.

On the one hand, taking exploration of our dataset as a model case, we suggest some clues for the design of a procedure tending to study whether actual judicial decisions on each subcategory of damages are gender-biased or not. The dissection of total amounts, according to the idiosyncrasy of any legal system in determining those subcategories, and the exogenous information employed, go in that way. All of it, beyond the wording of the grounds for the judgments.

On the other hand, it tries to expose the risks of the aforementioned opacity on the adjudication. Court decisions that deliberately or not (either by prejudice or out of habit) hide the procedure of calculation behind “judicial discretion” or other labels, are particularly prone to improperly reproduce previous biases or introduce their own. Opacity, which makes the results less visible and, therefore, less open to criticism, is a negative feature in itself to the objective of eliminating gender bias.

Thus, by applying a methodology of that kind in the scope of our dataset, we demonstrate that, in our case, some gaps exist, and every difference observed goes systematically against women. Some of them, moreover, are not merely a derived effect of the most visible earnings gap—not properly second order gaps.

The paper is structured as follows. Section 2 presents the database and methodology applied. Section 3, 4 and 5 undertakes the analysis of total damages, pecuniary damages (PD), and non-pecuniary damages (NPD), respectively. In Section 6 we draw some conclusions.

2. Methodology and Data

Argentina is a typical case of Civil Law country. Its original Civil Code, in force between 1871 and 2015, followed the French Civil Code with some ingredients of German Law, colonial Spanish Law, and others.

Argentina's Civil National Court of Appeals periodically publishes online summarized data regarding its own rulings on personal injury compensations since 1993 to present date, comprising decisions on death, injuries, NPD, healthcare professional's responsibility and damages derived from violence against women. Search results are displayed as dull tables coded in HTML markup language and cannot be downloaded in a structured, processable and, therefore, meaningful way.

The unstructured fashion in which said rulings are presented to the user hinders any substantial statistical analysis that could be directly performed. Manually gathering and classifying these search results into a structured layout would not only be time-consuming—exceeding our small team capabilities—, but also extremely tedious and error prone. To avoid these kind of issues, new strategies must come into play.

Web scraping is a technique used for extracting and structuring data from websites, where software automatically draws information from an unstructured human-readable source, usually storing it into some form of database or other data management system for its later recovery, processing and usage. This technique unleashes a wide gamut of possibilities for the kind of analysis we aim to tackle.

We further explore a dataset constructed in previous research¹², for which web scraping software was specifically developed to automatically download and structure data of thousands of rulings by Argentina's National Court of Appeals. The referred dataset is a compound of exactly 20,624 appellate decisions for a timespan dating back to 1992 through 2015. Here, we focus on a subset of 16,236 injury compensation rulings that represent 78.7% of the total data, of which 6,906 (42.5%) correspond to female victims and 9,330 (57.5%) to male ones.

To normalize monetary values in a context of high inflation, we adjust them to constant 2007 Argentinian pesos (ARS) using Argentina's National Institute of Statistics and Census (INDEC) indexes for the pre-2007 time series and inflation data from *inflacionverdadera* site since 2007¹³. The selected period is 1992-2015, discarding the first four years of the sample due to the hyperinflation context, which also results in some inconsistencies in the sums reported in the rulings, aggravated by the currency switch that took place in 1992. The same Civil Code was in force along the entire considered timespan.

The control variables that are scraped together with the appellate decisions can be seen in Table 14 in the appendix. There are several and will be crucial in order to isolate the possible gender gap, by controlling for the intrinsic characteristics of each particular sentence. Many of these variables correspond to character variables that indicate several categories and allow us to construct many indicator or dummy variables.

We use classical mean tests and linear regression approaches such as t-tests and OLS, but when accounting for all the possible variables present in the database, we choose a selection variable approach. This is so because many of the web scraped fields are string or character variables, such as occupation or education, which generates many indicator variables (as many as the categories present in the aforementioned string

¹² RAMÍREZ MUÑOZ DE TORO, «Reconstrucción y análisis de la base de datos de jurisprudencia de cuantificación de daños de la Cámara Nacional de Apelaciones en lo Civil», *Jurisprudencia Argentina, Número especial de Derecho y Economía*, I, 6, 2020, pp. 65-84.

¹³ CAVALLO, «Online and official price indexes: Measuring Argentina's inflation», *Journal of Monetary Economics*, 60, 2, 2013, pp. 152-165; MIRANDA-ZANETTI/DELBIANCO/TOHMÉ, «Tampering with inflation data: A Benford law-based analysis of national statistics in Argentina», *Physica A: Statistical Mechanics and its Applications*, 525, 2019, pp. 761-770.

variable). We propose a LASSO (Least Absolute Shrinkage and Selection Operator). A penalization term is added in the multivariate regression. This penalty term can be seen in equation 1.

$$\lambda \sum_{p=1}^p [(1 - \alpha)|b_p| + \alpha|b_p|^2] \tag{1}$$

As in classic OLS, the sum of squared residuals is minimized, but with the penalty term controlled by λ and α . If we have $\alpha=1$, so that we only penalize it quadratically, we have a RIDGE regression, and if $\alpha=0$ then the estimation becomes in the framework of LASSO estimators (least absolute shrinkage squared, the p coefficients corresponding to the p variables included as regressors (b_1, \dots, b_p) are obtained.

When $\lambda \neq 0$, we are in the context of penalty and variable selection, and when $\lambda=0$, we are in the classic context of OLS¹⁴. We chose LASSO because the optimization process makes some coefficients equal to zero (and therefore selects the rest of the variables)¹⁵. The method penalizes for the number of variables, so it reduces to zero the coefficients of those that contribute the least and the most important remain to explain the dependent. According to the penalty parameter, the coefficients are reduced towards zero. The remaining coefficients that stay different from zero are the ones resulting by applying the optimal λ obtained by cross validation.

We will also prove different assumptions for the reduced model, taking the possibility of non-linearities by means of interquartile and logit regressions, for the sake of completeness in the empirical exercise. The detailed results of this robustness checks are in the appendix.

3. Total Damages

Just to start, by means of descriptive statistics, the most superficial analysis on our database confirms the first intuition we pointed out. The total amount of damages received by persons classified as belonging to each of both genders, in the binary classification made by the court between “men” and “women”, shows a consistent gap in favor of men.

Figure 1:

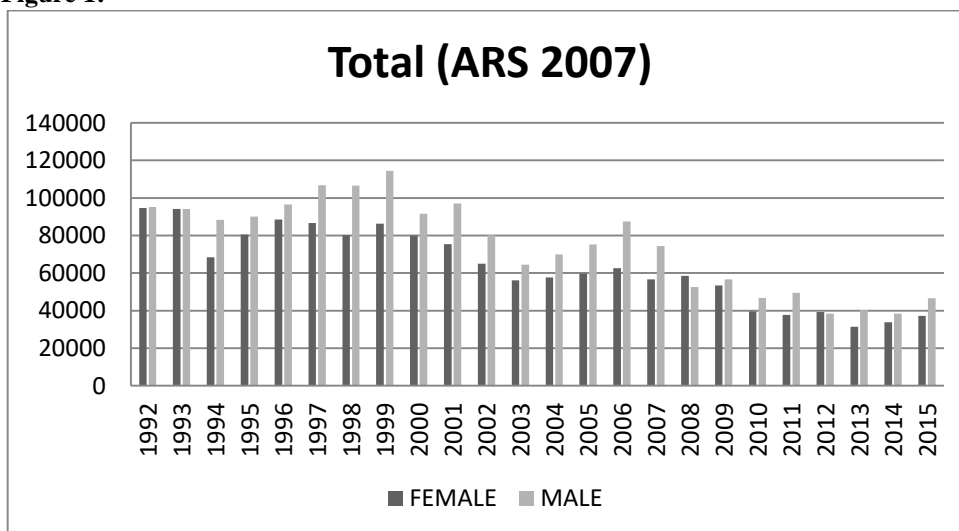


Figure 1 shows that total compensations awarded to men are greater than those assigned to women in every analyzed year, the exceptions being 2008 and 2012. For example, we can observe that in 2001, in average, a man received almost ARS 100,000, while a woman obtained below ARS 80,000. Table 1 shows that those differences are also, in most cases, statistically significant.

¹⁴ VARIAN, «Big data: New tricks for econometrics», *Journal of Economic Perspectives*, 28, 2, 2014, pp. 3-28.

¹⁵ JAMES et al., *An introduction to statistical learning*, Springer, New York, 2013.

Table 1: Mean t-test's p-values for total damage by year.

Year	P-value	Year	P-value
1992	0.487	2004	0.032
1993	0.501	2005	0.068
1994	0.024	2006	0.017
1995	0.208	2007	0.011
1996	0.181	2008	0.805
1997	0.035	2009	0.336
1998	0.001	2010	0.047
1999	0.047	2011	0.003
2000	0.082	2012	0.577
2001	0.003	2013	0.015
2002	0.025	2014	0.105
2003	0.051	2015	0.131

This initial finding is, however, still a dull and insufficient result, either to conclude the very existence of judicial discrimination or to say something significant on their characteristics and sources. As suggested, a deeper examination on its components is required to clarify those points. Hence, in the next sections, we undertake that task.

4. Pecuniary damages (PD)

Every serious enquiry on the matter requires accounting for the legal basis of reasoning. Sources of disparities, if any, may be found straightforwardly in the law the courts must apply to cases or in much more subtle facets of judicial practice, as better access to justice (access to more expensive and better lawyers), judicial prejudices or other factors.

Although sharing some common features, legal systems of different countries convey significant discrepancies on the matter. Hence, disentangling the so-called “legal ought” to shed light to numbers should be one of the basic steps of any sound framework of analysis.

In our case, according to the legal system implied (Argentina's), the reasoning the courts ought to develop to award compensations in this field has to distinguish two kinds of losses. On the one hand, those clearly related to productive activities, in terms of human capital, hereinafter called “pecuniary losses”, and its compensation, “pecuniary damages”. On the other hand, those included in the scope of the term “non-pecuniary”¹⁶, also known in the North American tradition as “pain and suffering”.

According to the usual description of the legal system in force at the time and place of the analyzed decisions, the latter should be determined with no relation to productivity or income of the victims. The former, instead, must include a compensation for their potential productivity—not exactly a sum in place of the present earnings, but a compensation for the loss of their potential productivity.

To clarify our categories, pecuniary losses are “consequential economic losses”, by opposition to “pure economic losses”. According to the literature, “pure economic losses” occur independently of any physical damage to the person or property of the victim. The kind of loss we are addressing to, instead, is clearly “economic”, yet it is consequential to injuries to the person.

On this ground, an intuitive conclusion might hold. If there is, in the world, an income gap against women, this implies that the economic value of their potential productivity would be assessed, in pecuniary terms, smaller than men's one. Hence, ethical and political considerations aside, at the same proportional loss of psychophysical capacity, women's compensation should be, in average, less than men's one simply by

¹⁶ For simplicity's sake, we use the terminology employed by SHAVELL, *Economic Analysis of Accident Law*, Harvard University Press, 2009, in this field.

derivation. Being this exact, this would be an undesirable but a derivative or second order gap, as we may call them. The source of this gap would be then merely the well-known income gap.

This rough intuition, however, must be checked more carefully. In accordance with mainstream legal understanding of the law (Argentinian Civil Code at the time of the decisions, now Civil and Commercial Code), compensation for loss of psychophysical capacity is not limited to professional or labor market earnings. Instead, that category must include the cost of certain activities that healthy victims regularly performed but they were not paid for. In usual economic language, the “shadow price” of those activities. Self-transportation, self-hygiene, general housework and care works are clear examples of these non-remunerated activities.

Judgments included in our database meet this criterion. For instance, among many other decisions¹⁷, on *Magallanes v. González Carreño*¹⁸, the Court asserted: «...[at] the time of quantifying [the] supervening disability [compensation], the incidence of permanent sequels and its pecuniary repercussions on all aspects of the victim’s life shall be evaluated, which include not only the impossibility to obtain greater income, but the need to realize disbursements that were not needed before, whether it is medical care, aid from third parties, transfers, et cetera, modifications in habits that imply putting aside certain activities or the need to accommodate places to do them».

This criterion is paralleled by several European countries’ systems, which compensate victims for the loss of housekeeping capacity. E.g., the Civil Division of the England and Wales Court of Appeal stated on its leading case *Daly v. General Steam Navigation Company*¹⁹ that a victim can recover the reasonable cost of replacement services associated with said loss. Other national legal systems, as French and Austrian, in turn, also award damages for the victim’s loss of autonomy and the consequential cost of other person’s assistance with housekeeping responsibilities²⁰.

Aside of some expenses²¹, the core of pecuniary compensation, in short, should capture the discounted value of a set of (potential) explicit earnings, lost because of the psychophysical harm, as well as the “shadow price” of some (potential) activities which victims need to substitute, according to their new psychophysical condition, by hiring costly services (cleaning, household care, transportation, et cetera). Hence, being other factors equal for both genders (discount rate, percentual loss of capacity, active life expectancy), only explicit earnings and the value of non-remunerated activities ought to be accounted for.

Then, if and only if the value of non-remunerated activities were zero for both genders, the gap in economic compensations would proportionally follow the income gap. Instead, if the value of non-remunerated activities were getting higher for women, the gap in economic compensations should narrow accordingly, tending to disappear first and reverse then.

¹⁷ On the impact of disability on every aspect of the victim’s personality, as well as on his or her personal and social life *Kissner v. Donadío*, Argentina’s Civil National Court of Appeals, Chamber G, judgment date: 25 September 2012; *Galván v. Arévalo*, Chamber J, judgment date: 26 May 2015; *Guerra v. Empresa de Ties. La Primera de San Isidro*, Chamber K, judgment date: 22 March 2012; *Montes v. Transporte Larrazábal CISA*, Chamber J, judgment date: 14 December 2022; *Moreno v. Álvarez*, Chamber C, judgment date: 1 December 2010; et cetera).

¹⁸ *Magallanes v. González Carreño*, Argentina’s Civil National Court of Appeals, chamber C, judgment date: 21 May 2010.

¹⁹ *Daly v. General Steam Navigation Company* [1981] 1 WLR 120.

²⁰ KARNER/OLIPHANT (eds.), *Loss of housekeeping capacity*, De Gruyter, 2012.

²¹ Medical expenses are less relevant in Argentina due to the characteristics of its social medical coverage. In countries with different kinds of universal health care, medical costs are not a relevant component or at least only a marginal fraction of damages. On the contrary, in countries with predominantly private health systems, they are.

4.1. The income gap and non-remunerated homework

According to TROMBETTA and CABEZÓN CRUZ²², and MICHA et al.²³, the income gap, in the relevant place (Argentina) and time (1992-2015) encompassed by our database, goes around 12 to 13%. It is heterogeneous and clearly diverges in relation to activities and levels of incomes, but it is clearly significant along all the income distribution. For our purposes, then, this loose consideration on its magnitude clearly helps.

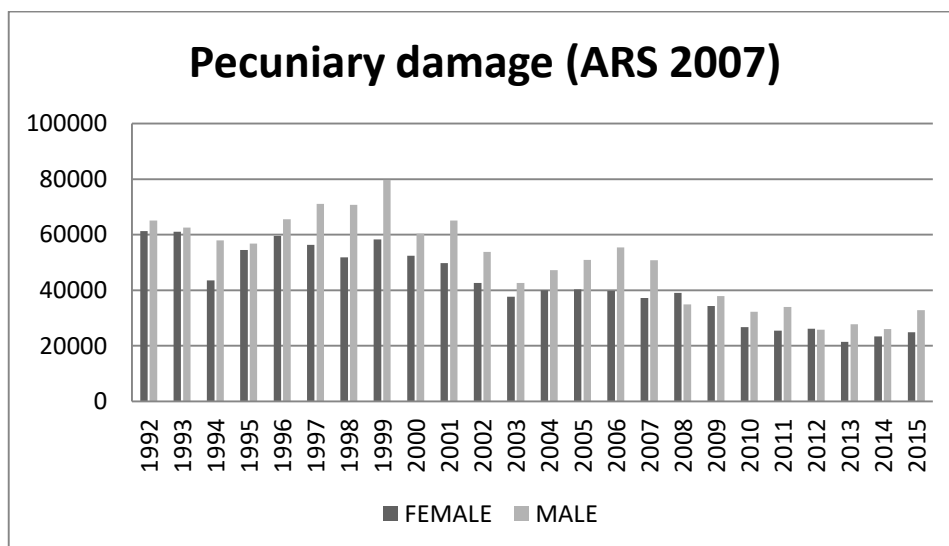
Recently, the MINISTRY OF ECONOMY OF ARGENTINA²⁴ carried out a measurement of unpaid work (domestic work and care services) and the economic impact of this sector on the GDP. This work demonstrates the importance of this phenomenon in the economy. There, it can be found different measurements that show the presence of the gender gap is observed both in the employment rate and in the income received.

However, women, in most societies and clearly in Argentina, devote a time disproportionately higher in relation to men to performing non-remunerated activities. MICHA et al.²⁵, using the Argentinian National Survey of Social Structure (2014/2015) data, find out differences by gender in the mean and median of weekly hours worked in non-remunerated activities of 19.1 y 15 versus 9.4 y 6, respectively.

Giving a pecuniary value to those time-data is not easy. Some factors should be considered. For instance, most household activities must take place in evening time, being hours that fall after the traditional workday (e.g., cooking dinner, early transportation, et cetera).²⁶ Being so, if they were standard job time, a good part of these hours should be paid with an overcharge. However, our aim is not an exact valuation of them, but a more modest one. Then, if differential non-remunerated work would roughly compensate for the income gap, resulting PD should be certainly similar.

In contrast to the previous guess, we can see that male means are greater in almost every year, and they are even significant. We can use the 2001 year again as an illustration: men are getting above ARS 60,000 in average in PD, while women receive below ARS 50,000.

Figure 2:



²² TROMBETTA/CABEZÓN CRUZ, *Brecha salarial de género en la estructura productiva argentina*, Seminario Centro de Estudios para la producción (CEP), Buenos Aires, 2020.

²³ MICHA/TROMBETTA/PEREYRA, «Determinantes del tiempo de trabajo de cuidado y brechas de género», *Márgenes*, 7, 7, 2021.

²⁴ MINISTERIO DE ECONOMÍA DE LA REPÚBLICA ARGENTINA, *Los cuidados, un sector económico estratégico: Medición del aporte del Trabajo Doméstico y de Cuidados no Remunerado al Producto Interno Bruto*, https://www.argentina.gob.ar/sites/default/files/los_cuidados_-_un_sector_economico_estrategico_0.pdf. More on the field on: https://www.indec.gob.ar/ftp/cuadros/publicaciones/dosier_estadistico_8M_2022.pdf

²⁵ MICHA/TROMBETTA/PEREYRA, *Márgenes*, 7, 7, 2021.

²⁶ UN WOMEN, *Redistribute unpaid work*. <https://www.unwomen.org/en/news/in-focus/csw61/redistribute-unpaid-work>.

Table 2: Mean t-test's p-values for PD, by year.

Year	P-value	Year	P-value
1992	0.395	2004	0.056
1993	0.046	2005	0.071
1994	0.011	2006	0.016
1995	0.4	2007	0.006
1996	0.184	2008	0.79
1997	0.026	2009	0.255
1998	0	2010	0.041
1999	0.068	2011	0.004
2000	0.075	2012	0.055
2001	0.004	2013	0.021
2002	0.018	2014	0.149
2003	0.078	2015	0.147

In short, the income gap exists in favor of men, but it should be compensated and even reversed by non-remunerated activities, disproportionately done by women. Being so, the income gap is not the reason for the total damages gap.

However, claims of discrimination based exclusively on the existence of this gap might be still unsound. PD are a function of income, but also of the disability caused by the psychophysical injury. So, we must also analyze the influence of this variable. Then, when we check PD by disability ranges, the results turn out to show that gender lose significancy as an explanatory variable.

In doing so, we will start with a simple exercise which consists in including some of the variables among the set of the scraped variables, controlling for trend²⁷ (e.g., year), disability, and square disability (to control for nonlinear effects or in case that diminishing or increasing returns of the percentage of disability exist over the non-economic damage). We estimate by means of robust regressions due the presence of heteroskedasticity (Breusch-Pagan test shows a p-value<0.01).

Table 3: OLS Robust Regression of PD

ED	Coef.	Std. Err.	T	P-value
Year	-1502.457	93.96616	-15.99	0
Male	1904.422	1271.355	1.5	0.134
Disability	158.7879	87.56971	1.81	0.07
Disability2	37.19887	1.154957	32.21	0
Constant	3026423	188372	16.07	0
Observations	13603			
Adjusted R2	0.3675			
F (4, 13598)	1976.66			

Table 3 shows a phenomenon out of our scope, as the declining value of PD through the years, something that is even visible in Figure 1.

²⁷ We also proved a time dummy specification and the results are similar. For parsimony purposes, we choose the trend variable.

Going back to our aim, disability, in turn, behaves as expected—its effect increases and is greater in the case of men. Finally, in this framework, gender shows non-significant. In short, then, when gravity (percentages) of disability is considered, the significance of the variable “gender” vanishes. In other words, differential PD awarded to men, aside from the effects of income gap and the neglect of non-remunerated activities, derive consistently from larger percentages of disability allocated to men.

The differential assignment of psychophysical disability percentage to men and women has also certain influence on another aspect: NPD. We study the point in the next section.

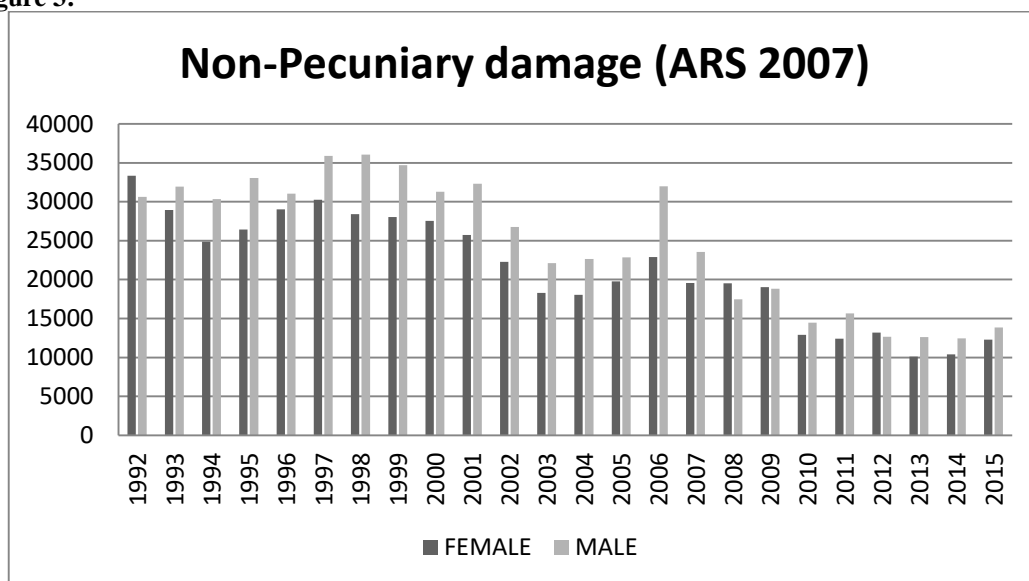
5. Non-pecuniary damages (NPD)

In this field, legal explanations on the national system we focused on fully agree that income, specifically, and economic productivity, in general, are not factors for the NPD determination.

This, too, is reflected in judgments included in our database. On *Kissner v. Donadio*²⁸, following *Chanquia v. Pérez*²⁹, the Court said: «...compensation of... [NPD], according to article 1078 of the Civil Code, is directed towards compensating sufferings, inconveniences and insecurities, only from a spiritual plane, with special importance given to the nature of the injuries and the degree of sequelae they leave behind, to show to what extent the personality and the feeling of self-worth has been affected», and that in order to «...pecuniarily estimate the repair of [said damages], there is no unit of measurement, since spiritual goods are not measurable in money».

This suggests that, in principle, and despite any difference of PD, given the same kind of personal injury, both genders should show no differences, in average. However, differences are clearly visible, as we can see in Figure 3.

Figure 3:



Tables 4 and 5 show the t-test—the first, divided by year, and the second, for the total sample. The results suggest that the difference is significant in general and, moreover, it is so for several particular years. For the sake of simplicity, means are not displayed, but they are larger for men than women for every year.

If we look one more time at the difference in year 2001 as an illustration, the gap is still there, with men on average obtaining above ARS 30,000, in contrast to women, who get slightly more than ARS 25,000. This difference is significant, as we can observe in Table 4.

²⁸ *Kissner v. Donadio*, Argentina’s Civil National Court of Appeals, chamber G, judgment date: 25 September 2012.
²⁹ *Chanquia v. Pérez*, Argentina’s Civil National Court of Appeals, chamber G, judgment date: 22 July 1992.

Table 4: T-test for NPD by years.

Year	P-value	Year	P-value
1992	0.6639	2004	0.0189
1993	0.2401	2005	0.1784
1994	0.0961	2006	0.0346
1995	0.0248	2007	0.0493
1996	0.2114	2008	0.8236
1997	0.072	2009	0.5288
1998	0.0102	2010	0.1063
1999	0.0198	2011	0.0076
2000	0.105	2012	0.6256
2001	0.0051	2013	0.0158
2002	0.0469	2014	0.0783
2003	0.0218	2015	0.1959

Table 5: Mean test for NPD.

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Interval]
Female	6,764	21034.52	402.6083	33111.93	20245.28 21823.75
Male	9,144	24732.54	406.5956	38880.4	23935.52 25529.56
Combined	15,908	23160.16	290.0551	36583.75	22591.62 23728.7
Diff.		-3698.022	585.9989		-4846.646 -2549.398

According to the values the latter table shows, the t-statistic of the t-test is -6.3106, which denotes that the difference between genders (totals) is clearly significant. As a percentage, it is approximately 15%. However, underlying both kinds of damages, PD and NPD, there is a pervasive difference in disability percentages determined to men and women. This difference deserves a more detailed analysis.

Tables 6 and 7 show the mean test exercise over the disability means, similar to the one applied to the NPD sums above.

Table 6: Mean t-test's p-values of disability, by year.

Year	P-value	Year	P-value
1992	0.0661	2004	0.0117
1993	0.041	2005	0.0043
1994	0.2471	2006	0.045
1995	0.0397	2007	0.0001
1996	0.0886	2008	0.3782
1997	0.2339	2009	0.0109
1998	0.0239	2010	0.0291
1999	0.0006	2011	0.0179
2000	0.0088	2012	0.4802
2001	0.0034	2013	0.1828
2002	0.0025	2014	0.3708
2003	0.2568	2015	0.0278

Table 7: T-test of disability means.

Group	Observations	Mean	Std. Err.	Std. Dev.	[95%	Interval]
Female	5,805	17.15059	0.2190114	16.6866	16.72125	17.57993
Male	7,828	19.77049	0.2187981	19.35838	19.34159	20.19939
Combined	13,633	18.65492	0.1568493	18.31379	18.34748	18.96237
Diff.		-2.6199	0.3164273		-3.240141	-1.999659

As it can be seen, the t-statistic on the overall sample is -8.2796 and the difference in disability percentages for men and women is more than 2 points. The difference, in sum, is significant.

A deeper analysis on these rough totals needs to be undertaken. As we have seen, in the field of NPD, neither income nor disability percentages by themselves ought to be factors. In purity, only differential kinds of personal injuries and, moreover, their aftermath and repercussions, must make the difference. E.g., in two individual cases, the same percentage might correspond, in fact, to injuries having different moral or non-pecuniary impact. Our dataset, in turn, does not differentiate kinds of injuries but disability percentages. In large numbers, though, we may guess that percentages seem a very reasonable proxy of kinds of injuries and its non-pecuniary upshot—the higher the disability percentage, the more serious the non-pecuniary impact of the injury.

Assuming that premise, and following the conventional legal wisdom on the field, an immediate red flag shows up. In large numbers, we might guess, averages of disability for men and women must show no systematic differences between genders. Hence, if some difference appears, this will require a thorough explanation.

To test the effect of differential disability percentages, our strategy consists in segmenting the universe in N ranges of loss of capacity, each of them as a proxy of a set of relatively uniform sort of injuries. This task is done by dividing the dataset into three subsamples: the first quartile (proxy of minor injuries), the second and third quartiles (moderate) and the fourth one (serious)³⁰.

As we can see, the initial gap vanishes, and no clear pattern remains³¹. The obvious interpretation is that differential NPD are consequential to different incapacity percentages—representative of differential moral and emotional impacts. Equaled the seriousness of disability, no gap in NPD verifies.

³⁰ We also perform the analysis dividing the sample in more bins, but for presentation purposes we only show the simplest. The conclusions remained the same with 10 and 20 bins of percentage disability.

³¹ We also divided the simple in 5 percentage points bins, with similar results. In both cases we perform t-tests. These results are available upon request but for sake of simplicity not displayed.

Table 8: NPD in ARS 2007, by disability quartiles, years and gender.

	Q1	Q2-Q3	Q4	Q1	Q2-Q3	Q4	Q1	Q2-Q3	Q4
Year	1992			1993			1994		
Female	10738	32158	24931	11648	36714	18521	11310	32484	27297
Male	13333	32971	18206	11746	46303	23567	11386	33554	34447
Year	1995			1996			1997		
Female	13166	33181	28620	15308	34139	22323	14013	39346	21745
Male	11060	43954	32984	13121	44154	32896	15297	39413	65235
Year	1998			1999			2000		
Female	17259	43149	32521	15331	33173	19711	13261	37644	25603
Male	15200	43375	31415	16846	43459	34075	13367	44312	28856
Year	2001			2002			2003		
Female	13374	44431	22268	9284	32403	18329	10891	29605	15695
Male	13264	55670	33180	9641	43294	31196	9397	39140	15650
Year	2004			2005			2006		
Female	10520	22778	15088	10846	34043	19709	12312	37754	19171
Male	11726	30632	22383	9628	27786	18944	12134	33706	31194
Year	2007			2008			2009		
Female	9874	23651	20261	9482	28871	16109	7416	21080	13824
Male	10467	33057	22038	9021	22374	11223	8086	27792	20973
Year	2010			2011			2012		
Female	6705	18725	11924	7118	17975	7590	5246	16935	10290
Male	5923	22711	11845	7277	20240	14555	5890	17318	10391
Year	2013			2014			2015		
Female	5040	15729	7733	4935	15770	7947	5418	14301	16717
Male	5019	17845	9788	4712	19741	9424	5478	15725	10720

To corroborate this conclusion, we perform a series of empirical exercises to determine the relation between disability, gender and NPD. As in the case of PD, we will start with a simple regression and the same control variables.

The takeaway of this first exercise is the same as in the case of the PD: increasing effects of percentage disability declared and non-significance of the dummy variable, as we can see in Table 9, where the dummy variable corresponding to males is non-significant (and the only one with a p-value above 0.01).

Table 9: OLS Robust Regression of NPD

NPD	Coef.	Std. Err.	t	P-value
Year	-844.381	33.0693	-25.53	0
Male	664.1784	447.4251	1.48	0.138
Disability	111.7939	30.81821	3.63	0
Disability^2	15.0358	0.4064612	36.99	0
Constant	1701628	66293.31	25.67	0
Observations	13603			
Adjusted R2	0.4599			
F (4, 13598)	2896.20			

On the other hand, as we see in the t-test, there are differences between genders. If we run a simple OLS controlling with a trend variable, we find 2.6 points of difference in disability allocated to men (similar to the mean difference, so it seems that there is not a temporal effect).

Table 10: OLS Robust Regression of Disability %.

Disability	Coef.	Std. Err.	t	P-value
Year	-0.1940695	0.023328	-8.32	0
Male	2.605047	0.3156436	8.25	0
Constant	406.0823	46.75184	8.69	0
Observations	2176			
Adjusted. R2	0.0174			
F (4, 13598)	20.25			

There is a good amount of relevant information not considered in both the regression and mean test exercises so far. That is, the particularities of each observation. So, we use all the potential explanatory variables in the database, such as described in the methodology section. The number of variables increases quickly when considering all possible dummies variables resulting from available data such as occupation, studies, etc. Due to the dimensionality of this task, we run an exercise of variable selection with the final purpose to check if the gender variable remains relevant, once controlled by all other possible factors (present in our scraped database as described also in section 2).

The resulting coefficients can be seen in Table 11. For the sake of comparison, we include the regression coefficients obtained by OLS. We use a LASSO penalty, so the penalties leave the relevant coefficients different to zero. We can observe that, even shrunken, the gender dummy remains relevant in the disability equation, but is equal to zero in the NPD regression.

Table 11: Coefficients of OLS and LASSO.

METHOD	OLS	OLS	LASSO	LASSO
Dependent	DISABILITY	NPD	DISABILITY	NPD
Constant	406.0823	1701628	284.767	1599221
Male	2.605047	664.1784	2.063536	0
Disability	-	111.7939	-	143.1825
Disability^2	-	15.0358	-	14.25011
Year	-0.1940695	-844.381	-0.133838	-793.5204
Age	0.0372173	-211.5866	0.0302982	-157.143
Dummy controls:				
Chamber	NO	NO	YES	YES
Character	NO	NO	YES	YES
Occupation	NO	NO	YES	YES
Civil status	NO	NO	YES	YES
Studies	NO	NO	YES	YES
Lambda	-	-	0.2718	402.979
Alpha	-	-	1	1
Adjusted R2	0.01	0.46	0.0602	0.484
Observations	13633	13603	13622	13592

Our results, in sum, reveal that, aside from the income gap and its outcomes, and a probably inaccurate valuation of non-remunerated activities, another core point might be accounted for, which is a differential and probably biased determination of percentage of disability against women. If any, the source of this gap in NPD seems to be there.

Nonetheless, the counterargument to explore is that this gap might merely reflect the external world. Whether, in the world, men suffered accidents of higher magnitude, the differential in judicial determination of NPD would only reflect that exogenous reality.

And this might be the case. It is well known, for instance, that men, as a category, are riskier drivers than women and they are also the gender with most fatal victims in car accidents. There is a vast literature supporting that premise. For instance, SCHWARZ³² and BARRY³³ show that men more frequently engage in more dangerous activities and, consequently, they are also exposed to more severe brain damage.

However, there is an alternative to explore. When we affirm that victims' own risky actions yielded graver harms, this assumes they have the control over the action, as in the case of driving. On the contrary, if we focused on cases where victims are merely passive, the initial conjecture would not apply. If, even in these cases, the disability determined shows the same differential in favor of men, there might be an additional factor, different from men's risk proneness, to discover. Bodily structural weakness of men and implicit gender bias in medical determination of disability would be candidates.

Being a car passenger might be an archetypical case of victim passiveness. Passengers are, in larger numbers, merely passive and its influence on the causation of car accidents tends to zero. The case of car accidents, in turn, is archetypical and well documented. There is a clear consensus in data and literature on that, being all things equal, women are more prone to suffer more serious injuries and death.³⁴

Moreover, the debate is centered on the factors to explain that recognized disadvantage. A report from the DEPARTMENT OF PLANNING, TRANSPORT AND INFRASTRUCTURE OF THE GOVERNMENT OF SOUTH AUSTRALIA in 2017 shows that males are involved in more severe car accidents.³⁵ Also, a 2013 report by the National Highway Traffic Safety Administration of the US (NHTSA)³⁶ points that the protective technologies are designed for an average man and leaves less protected older and younger men, as well as female occupants.

Hence, we study the case of car passenger victims trying to check this alternative hypothesis—bias in the disability determination. Our hypothesis is, being passengers merely passive victims, the seriousness of psychophysical injuries must show no difference between equally vulnerable subjects, unless other factors show up. In our exploration, equal vulnerability is not even the case—it is an undisputed fact that women suffer, as a category, more serious injuries, either by natural or cultural factors. Then, if judicial decisions determine that women suffer the same or less disability percentages than men as a consequence of that category of events (as passengers in car accidents), we could be able to suspect a bias in that determination. Simply, for it contradicts exogenous, real-world data.

Our results, in sum, go along that line and show less disability percentages allocated to women. We test the differences, and the result is that female passengers have lower disability percentages determined than men (P-value = 0.0784 with 1411 degrees of freedom).

³² SCHWARTZ/BEAVER, «Serious fighting-related injuries produce a significant reduction in intelligence», *Journal of Adolescent Health*, 53, 4, 2013, p. 520-525.

³³ BARRY, «The Crash Test Bias: How Male-Focused Testing Puts Female Drivers at Risk», *Consumer Report*, 2019. <https://www.consumerreports.org/car-safety/crash-test-bias-how-male-focused-testing-puts-female-drivers-at-risk/>.

³⁴ INSURANCE INSTITUTE FOR HIGHWAY SAFETY (IIHS), *Fatality Facts*, 2018. <https://www.iihs.org/topics/fatality-statistics/detail/gender>.

³⁵ DEPARTMENT OF PLANNING, TRANSPORT AND INFRASTRUCTURE (DPTI) OF THE GOVERNMENT OF SOUTH AUSTRALIA, *Males and females involved in road crashes in South Australia*, 2020.

³⁶ NATIONAL CENTER FOR STATISTICS AND ANALYSIS. (2015, July) *Overview: 2013 data*. (Traffic Safety Facts. Report No. DOT HS 812 169). Washington, DC: National Highway Traffic Safety Administration.

Table 12: Mean tests, by character and gender.

	Driver	Passenger
Female	12.2953 (0.5603)	14.7922 (0.5039)
Male	14.5322 (0.3597)	16.0273 (0.7492)
Ha: diff < 0	Pr(T < t) = 0.0014	Pr(T < t) = 0.0784

As it is easy to infer, at least in this category of cases, the higher disability rates determined to men over women do not look justified. This peculiar kind of judicial error is, in our dataset and might be in any, what verifies a source of bias in compensation.

Table 13: OLS Robust regressions with Driver/Passenger subsamples.

Both				
Disability	Coef.	Std. Err.	t	P>t
Year	-0.2745476	0.0397733	-6.9	0
Male	0.9827033	0.5597293	1.76	0.079
Constant	564.5548	79.72147	7.08	0
Observations	3588			
Adjusted. R2	0.0136			
F (2, 3585)	25.65			

Driver				
Disability	Coef.	Std. Err.	t	P>t
Year	-0.2687369	0.0472972	-5.68	0
Male	2.175699	0.7916381	2.75	0.006
Constant	551.0553	94.79711	5.81	0
Observations	1412			
Adjusted. R2	0.0146			
F (2, 1409)	11.42			

Passenger				
Disability	Coef.	Std. Err.	t	P>t
Year	-0.2986051	0.0699753	-4.27	0
Male	2.120282	0.9690159	2.19	0.029
Constant	613.7583	140.2623	4.38	0
Observations	2176			
Adjusted. R2	0.0174			
F (2, 2173)	20.25			

6. Conclusions

Gender bias is not a single effect but a set of diverse cases of unfairness. Gaps in compensation for personal injuries are among the complex ones. Its complexity stems from various sources. Any fruitful treatment of disparities in damages awarded to each gender should be refined, focusing on any elements of damages awards. To do so, the specific law ruling the case or set of cases must be carefully considered at the risk of drawing inaccurate conclusions. Statistical studies, sometimes, tend to focus on too broad numerical aspects, disregarding this idiosyncratic and local nature of the law ruling the set of cases.

A reasonable first step, then, could be distinguishing derivative and original sources of bias. On the one hand, some elements of damages are structural derivations of factors exogenous to the legal system and to judges' activity, as earnings. Then, assuming some general earnings gap, losses depending on earnings (via *restitutio in integrum*) will mirror that difference (second order gap). In these cases, an unbiased application of legal norms or criteria in force lead to award differential amounts.

On the other hand, there exist some cases within which not the world nor the legal system, but the judges' or other officials' performance, may generate a biased adjudication. In those cases, an appropriate performance by officials and magistrates in applying the law will create no bias, but an improper one, will.

There is a third kind of malfunction relatively independent from the former. That is a particularly obscure and usually implicit way to show the judicial reasoning on quantification. Precision, transparency, and explicitness on the procedure of adjudicating every kind of damages and its numerical premises help distinguish biases from mere fair differences and first order from second order gaps, if any. Vagueness, opacity, and indistinctness, instead, make any criticism harder and contribute to perpetuate biases, if any. Courts in Civil Law countries are particularly prone to fall in that failure.

Accounting for that framework, our research sketches a canon of analysis and applies that canon to a case study. In doing so, we dealt with risks of cherry picking and inaccurate sample design by including all decisions made during the time span (16,236). A software "bot" designed ad hoc by one of us has been instrumental to build an exhaustive database.

On that basis, we start by finding out that rough averages in damages awarded show a significant gap in favor of males. This was not, however, a conclusion, but a starting point. Disentangling its elements by means of the appropriate statistical procedures, in the light of the specific legal framework, is the real task.

In our case study, according to the legal system in force, derivations of the earnings gap ought not to be mirrored in magnitude by PD. Being this category integrated by "shadow prices" of non-remunerated activities along with earnings losses, a fair quantification would be the result of two counterbalanced effects. On the one hand, earnings gap, which goes against women. On the other, the "shadow price" of time devoted to non-remunerated activities, against men, as women spend much more time in this kind of activities.

NPD, in turn, ought to be independent of earnings. Salary or pay gap should play no role on its magnitude, then. Nonetheless, we found significant differences both in PD and NPD damages separately considered.

At that point, our analysis turned the focus on two aspects. On one thing, the percentage of disability determined by expert witnesses. On the other, on ratifying the relevant role of opacity in the process of quantifying to hide potentially biased results.

PD are a function of percentages of disability reported by medical exams. NPD are not. However, reports on percentages of disability may be seen as proxies of psychophysical injury's seriousness. Hence, biased determinations of these percentages will result, in the end, in biased PD and NPD.

In our dataset, we found a systematic gap in disability percentages in favor of males. This finding is a matter of discussion and interpretation. In cases where men are active agents of their own harm there is no surprise, because abundant literature shows a tendency of men, especially young men, to enroll in riskier activities than women.

However, when the victim is clearly passive, the same effect does not hold. Then, if the gap in percentages of a disability showed a systematic disparity even in these cases, we could suspect a bias. To check this possibility, we analyze a clear-cut category as car passenger victims, in relation to which the literature finds a unanimous conclusion—women are, generally, more seriously injured, in significant measure.

Even within this subset, however, percentages of disability determined in favor of men are systematic and statistically significant in our dataset. So, a source of gender discrimination might be suspect in here. The previous findings reinforce, as seen, the concern on transparency and explicitness in the reasons to quantify damages in judicial decisions. The main advice to judicial policy in this field, maybe, should be about the emphasis on clear and explicit processes of quantification. In its absence, the difficulty in discovering neat cases and sources of discrimination is, probably, a contributory factor of biased behavior, but undoubtedly a reason for its persistence when it exists.

The effect is twofold. The exogenous critic viewpoint is, for sure, the most evident. Evolution of institutions requires openness to criticism. Efforts to ease the role of public and academic criticism to discrimination is, usually, one of the weapons to fight against it. On the other side, judges focused on the task of identifying and showing the numerical and conceptual basis of their determinations, exposing them to the parties and to the public, would hopefully be less prone to incur in improper failures as discrimination, for behavioral reasons and even for self-interest motives, related to their professional reputation and future.

Further research can be made on some particularities of the results and the Argentinian context. There are two main branches to study. One of them is the constant decline in the sums that the judges decide in their sentences, which is probably a side effect of the inflationary context. The other is the existence of differences between chambers given the significance of the dummy variables that control for this possible heterogeneity. This latter heterogeneity could be explored by controlling for the gender composition of the chambers and specific judge effects, but our database does not contain these variables.

7. References

BARRY, Keith, «The Crash Test Bias: How Male-Focused Testing Puts Female Drivers at Risk», *Consumer Report*, 2019. <https://www.consumerreports.org/car-safety/crash-test-bias-how-male-focused-testing-puts-female-drivers-at-risk/>.

BERNSTEIN, David E., «Procedural tort reform: Lessons from other nations», *Regulation*, 19, 1, 1996, p. 71.

CAVALLO, Alberto, «Online and official price indexes: Measuring Argentina's inflation», *Journal of Monetary Economics*, 60, 2, 2013, pp. 152-165.

CHAMALLAS, Martha, «The architecture of bias: Deep structures in tort law», *University of Pennsylvania Law Review*, 146, 2, 1998, pp. 463-531. <https://doi.org/10.2307/331262>.

--, «Questioning the Use of Race-Specific and Gender Specific Economic Data in Tort Litigation: A Constitutional Argument», *Fordham Law Review*, 63, 1994, p. 73. <https://ir.lawnet.fordham.edu/flr/vol63/iss1/6>.

DEPARTMENT OF PLANNING, TRANSPORT AND INFRASTRUCTURE (DPTI) OF THE GOVERNMENT OF SOUTH AUSTRALIA, *Males and females involved in road crashes in South Australia*, 2017.

DIRECCIÓN NACIONAL DE ECONOMÍA, IGUALDAD Y GÉNERO, «Los cuidados, un sector económico estratégico: Medición del aporte del Trabajo Doméstico y de Cuidados no Remunerado al Producto Interno Bruto», Secretaría de Política Económica, Ministerio de Economía de la República Argentina. https://www.argentina.gob.ar/sites/default/files/los_cuidados_-_un_sector_economico_estrategico_0.pdf.

FRIEDMAN, Jerome/HASTIE, Trevor/TIBSHIRANI, Robert, «Regularization paths for generalized linear models via coordinate descent», *Journal of statistical software*, 33, 1, 2010, p. 1.

GOODMAN, Loren D., «For what it's worth: the role of race-and gender-based data in civil damages awards», *Vanderbilt Law Review*, 70, 2017, p. 1353. <https://scholarship.law.vanderbilt.edu/vlr/vol70/iss4/4>

IKEDA, Keiko, «Gender differences in human loss and vulnerability in natural disasters: a case study from Bangladesh», *Indian Journal of Gender Studies*, 2, 2, 1995, p. 171-193. doi:10.1177/097152159500200202

INSURANCE INSTITUTE FOR HIGHWAY SAFETY (IIHS), *Fatality Facts*, 2018. <https://www.iihs.org/topics/fatality-statistics/detail/gender>.

JAMES, Gareth et al., *An introduction to statistical learning*, Springer, New York, 2013.

KAHANE, Charles J., *Injury vulnerability and effectiveness of occupant protection technologies for older occupants and women*, Report No. DOT HS 811 766, National Highway Traffic Safety Administration, U.S. Department of Transportation, 2013.

KARNER, Ernst/OLIPHANT, Ken (eds.), *Loss of housekeeping capacity*, De Gruyter, 2012.

KLEVEN, Henrik/LANDAIS, Camille/SØGAARD, Jakob Egholt, «Children and gender inequality: Evidence from Denmark», *American Economic Journal: Applied Economics*, 11, 4, 2019, pp. 181-209.

MARTÍN-CASALS, Miquel, «Por una puesta al día del sistema de valoración del daño corporal (“baremo”)», *InDret Penal*, 4, 2012.

MCINNES, Mitchell, «The Gendered Earnings Proposal in Tort Law», *The Canadian Bar Review*, 77, 1998, p. 152.

MIRANDA-ZANETTI, Maximiliano/DELBIANCO, Fernando/TOHMÉ, Fernando, «Tampering with inflation data: A Benford law-based analysis of national statistics in Argentina», *Physica A: Statistical Mechanics and its Applications*, 525, 2019, pp. 761-770.

NEUMAYER, Eric/PLÜMPER, Thomas, «The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy», 1981–2002. *Annals of the association of American Geographers*, 97, 3, 2007, pp. 551-566.

NG, Serena, «Opportunities and challenges: Lessons from analyzing terabytes of scanner data», *National Bureau of Economic Research*, 2017. <https://www.nber.org/papers/w23673>.

RAMÍREZ MUÑOZ DE TORO, Gonzalo R., «Reconstrucción y análisis de la base de datos de jurisprudencia de cuantificación de daños de la Cámara Nacional de Apelaciones en lo Civil», *Jurisprudencia Argentina, Número especial de Derecho y Economía*, I, 6, 2020, pp. 65-84.

RENAUD, Kathleen, «Apples to Oranges: Gendered Damages in Personal Injury Litigation: A Focus on Infant Claims», *Alberta Law Review*, 56, 2018, p. 207.

SCHWARTZ, Joseph A./BEAVER, Kevin M., «Serious fighting-related injuries produce a significant reduction in intelligence», *Journal of Adolescent Health*, 53, 4, 2013, pp. 520-525.

SHARKEY, Catherine M., «Valuing Black and Female Lives: A Proposal for Incorporating Agency VSL into Tort Damages», *Notre Dame Law Review*, 96, 2020, p. 1479.

SHAVELL, Steven, *Economic Analysis of Accident Law*, Harvard University Press, 2009.

SHAFIR, Eldar/DIAMOND, Peter/TVERSKY, Amos, «Money illusion», *The Quarterly Journal of Economics*, 112, 2, 1997, pp. 341-374.

ROJO BRIZUELA, Sofía/TUMINI, Lucía, «Inequidades de género en el mercado de trabajo de la Argentina: las brechas salariales», *Revista de Trabajo Nueva Época*, 4, 6, 2008, pp. 53-70.

TINARI, Frank D., «Challenges in Valuing Loss of Services», in TINARI, FRANK D. (ed.), *Forensic Economics. Assessing Personal Damages in Civil Litigation*, Palgrave Macmillan, New York, 2016, pp. 161-177.

TROMBETTA, Martín/CABEZÓN CRUZ, Julieta, *Brecha salarial de género en la estructura productiva argentina*, Seminario Centro de Estudios para la producción (CEP), Buenos Aires, 2020, https://www.argentina.gob.ar/sites/default/files/dt_2_-_brecha_salarial_de_genero.pdf.

MICHA, Ariela/TROMBETTA, Martín/PEREYRA, Francisca, «Determinantes del tiempo de trabajo de cuidado y brechas de género», *Márgenes*, 7, 2021.

MINISTERIO DE ECONOMÍA DE LA REPÚBLICA ARGENTINA, *Los cuidados, un sector económico estratégico: Medición del aporte del Trabajo Doméstico y de Cuidados no Remunerado al Producto Interno Bruto*, https://www.argentina.gob.ar/sites/default/files/los_cuidados_-_un_sector_economico_estrategico_0.pdf.

UGARTE, Sebastian M./GRIMSHAW, Damian/RUBERY, Jill, «Gender wage inequality in inclusive and exclusive industrial relations systems: a comparison of Argentina and Chile», *Cambridge Journal of Economics*, 39, 2, 2015, pp. 497-535.

WARD, John O., «Differences Among Nations in Measuring Economic Damages», in TINARI, Frank D. (ed.), *Forensic Economics. Assessing Personal Damages in Civil Litigation*, Palgrave Macmillan, New York, 2016, pp. 305-316.

WARD, John O./THORNTON, Robert J. (eds.), *Personal Injury and Wrongful Death Damages Calculations: Transatlantic Dialogue*, Emerald Books, 2009

VARIAN, Hal R., «Big data: New tricks for econometrics», *Journal of Economic Perspectives*, 28, 2 2014, pp. 3-28.

8. Appendix

Table 14: Variables obtained by web-scraping

Variable	Type	Description
Case number	num	The case number, as it is identified by Argentina's Civil National Court of Appeals website.
Case name	str	The case name.
Casualty	str	The casualty or damaging event type.
District court number	num	The intervening district court.
District court case number	str	The case number, as it is identified by the intervening district court.
District court decision date	num	The date of the district court decision.
Court of appeals chamber	str	The intervening court of appeals chamber.
Court of appeals case number	str	The case number, as it is identified by the intervening court of appeals.
Court of appeals decision date	str	The date of the court of appeals decision.
Casualty date	str	The casualty or damaging event date.
Age	num	The victim's age at the time of the damaging event.
Marital Status	str	Married, Single, Concubine, Widower, Divorced
Employment	str	Main occupation activity
Gender	str	Male or Female
Health	str	Health conditions
Education	str	Education level obtained
Physical disability percentage	num	The physical disability percentage acknowledged by the court of appeals.
Psychical disability percentage	num	The psychical disability percentage acknowledged by the court of appeals.
Aesthetic disability percentage	num	The aesthetic disability percentage acknowledged by the court of appeals.
Psychophysical disability percentage	num	The psychophysical disability percentage acknowledged by the court of appeals.
Surgeries	str	The number of surgeries as consequence of the damaging event.
Recovery period	num	The recovery period acknowledged by the court of appeals, in days.
Supervening disability amount	num	The supervening disability compensation awarded by the court of appeals.
Psychical disability amount	num	The physical disability compensation awarded by the court of appeals.
Aesthetical damage amount	num	The aesthetical damage compensation awarded by the court of appeals.
Medical expenses	num	The medical expenses compensation awarded by the court of appeals.
Moral damage amount	num	The moral damage compensation awarded by the court of appeals (i.e., NPD)

Note: "num" denotes a numerical variable while "str" indicates that the variable is a string or a character.

Table 15. Partial correlations for PD and NPD by gender

	PD	NPD
Gender	0.0505	0.05

Male

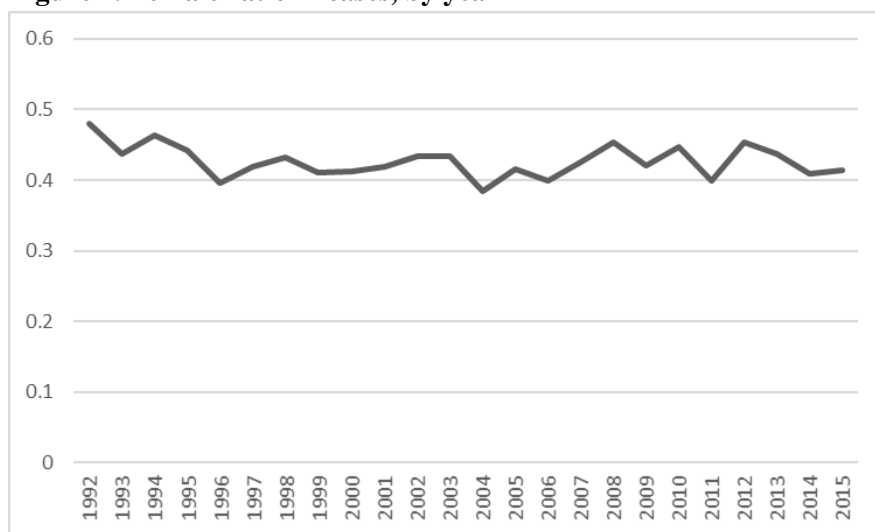
Studies	-0.0461	-0.0407
Age	-0.1056	-0.0994
Year	-0.1723	-0.199
Incapacity	0.6261	0.6239

Female

Studies	0.0116	-0.0027
Age	-0.0978	-0.0968
Year	-0.1688	-0.205
Incapacity	0.5758	0.5993

Note: The gender variable takes value 1 for male and 0 for female, so the positive correlation shows higher damages (both pecuniary and non-pecuniary). The variable indicates the level of studies is a categorical one, with higher values corresponding to higher stages in level education.

Figure 4. Female ratio in cases, by year



Note: The share of woman’s participations doesn’t show any trend and remains mainly stable between 39 and 48% of the cases analyzed.

Robustness Checks

There exists the possibility that the effects are not linear, or, in particular, not constant for all the distribution of the variables of interest. In order to explore this characteristic, we run an interquartile regression, considering the first quartile, the median, and the fourth.

The results can be seen in tables 16 and 17, for the disability and the NPD, against the same variables that were included in previous models. In the first case, the effect is increasing, from less of a point in the first quartile, to approximately one point in the median regression, and up to above 4 points in the last quartile. The negative trend is also negative, but increasingly negative.

In the second case, it is interesting to note that there exists now a significant effect for the gender dummy, but only in the median, and not in the extreme quartiles.

Table 16: Interquartile regression for disability (%)

Disability	Coef.	Bootstrap Std. Err.	t	P-value
q25				
Year	-0.0555556	0.0314291	-1.77	0.077
Male	0.7222222	0.3507402	2.06	0.04
Constant	116.2222	63.01498	1.84	0.065
q50				
Year	-0.2105263	0.0178903	-11.77	0
Male	1.052632	0.3226137	3.26	0.001
Constant	433.7368	35.7706	12.13	0
q75				
Year	-0.3125	0.0232145	-13.46	0
Male	4.25	0.4620349	9.2	0
Constant	645.125	46.85012	13.77	0

Table 17: Interquartile regression for NPD

NPD	Coef.	Bootstrap Std. Err.	t	P-value
q25				
Year	-348.3315	8.593413	-40.53	0
Male	92.36914	100.956	0.91	0.36
Disability	200.9006	15.72862	12.77	0
disability2	5.108947	0.4212543	12.13	0
Constant	702406.5	17259.6	40.7	0
q50				
Year	-558.1679	13.81284	-40.41	0
Male	348.6875	152.2397	2.29	0.022
Disability	262.6863	25.38769	10.35	0
disability2	8.833909	0.6702434	13.18	0
Constant	1125319	27736.17	40.57	0
q75				
Year	-848.489	20.2337	-41.93	0
Male	215.7693	257.9681	0.84	0.403
Disability	349.2602	46.99261	7.43	0
Disability2	14.58727	1.280126	11.4	0
Constant	1710997	40703.29	42.04	0

Finally, another possible extension is by not imposing a linear relationship in the coefficients, and using the fact that disability is a percentage, transforming the dependent variable into a variable bounded between 0 and 1, we obtain the results found in the Table 18 with logit regressions. The marginal effect of the gender dummy variable is 2.56 gap disability points of difference, similar to previous results.

Table 18. Logit regressions on disability.

Disability	Observed	Bootstrap	z	P>z
	Coef.	Std. Err.		
Age	0.0160964	0.001725	9.33	0
Year	0.0077637	0.0038577	2.01	0.044
Male	0.2121723	0.0501265	4.23	0
Constant	-14.4742	7.734759	-1.87	0.061