Gender pay gap: The Dollar-And-Cents Case: Hidden factors behind the story
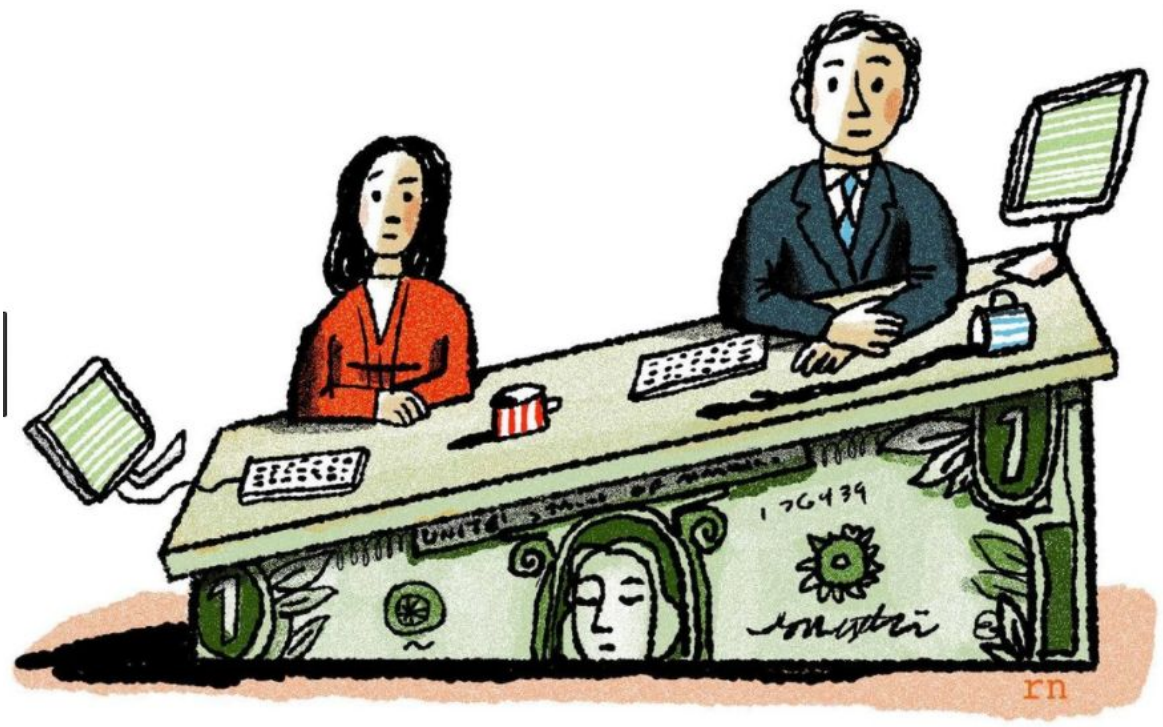
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About the project:

According to an article by Forbes even undergraduate women from Harvard believe that when they are going to earn they will get 78 cents on a dollar compared to men just because they are women. Those women admitted to Harvard can be distinguished from the smartest, most talented and most dedicated of their high school peers but even if they can freak out over the issue, we feel anyone can feel the same. Being a woman dominated group ("in the number of participants") we are very much concerned that all of our hard work should not become a victim of gender bias if it exists. Here, we found our way to start our analysis of this critical issue of PAY wage gap in the USA. We were five team members in a team and everyone is responsible for their parts of the project done.

Claim:

Researchers claim that women in the USA earn 78 cents on the dollar compare to men, this story doesn't hold good for gender bias. The project does not hold any specific claim for the issue whereas we tried analyzing several factors contributing to the difference. In order to resolve the issue women should come up with a clear understanding of what they doing wrong or what holds them back.Women voluntarily picked up lesser paying jobs and there are fields in which women are earning equally to men in the same profession such as Tennis. There are fields such as entertainment and movies in which women are earning less but it requires critical analysis of genre, screen time, lead role e.t.c. However, we cannot just conclude with one metrics that women are not the victim of discrimination but pay wage gap is certainly a huge issue and we suggest that women right from the early education should boost their Morale to pick up high-paid occupations.

Audience:

This visualization is a story-telling to any non-technical audience. The target audience is general public and whosoever is concerned with this information.
However, we will encourage females to get insights from the project as it reveals many strong factors about picking up the right jobs in order to overcome unequal gender pay.

Resources and Tools:

We have started searching out for a topic while coordinating amongst each other and chose Women Empowerment. All the data sources come from various fields such as occupation, education, entertainment, sports e.t.c. .Datasets are mainly those focused on gender-based datasets for the US primarily. We cleaned the data in Jupyter Python notebook and excel. All the visualizations are made in Tableau.

Data Sources: All the data sources have been provided by team members for their respective research on datasets

Census.gov
Bureau Of Labour Statistics
Time
money.cnn.com

Tableau Public Link:
https://public.tableau.com/profile/yuan8590#!/

Objective: The objective of the project is to drill down the current situation and an analysis of existing claims. The project falls under the category of Visual confirmation where in we need to find out the root cause of unequal gender pay. There are so many articles available over the Internet which talks about the different dimension of the issue. The one from Forbes talks about interviewing 70 undergraduate women who believe that they are going to become a victim of this impediment.

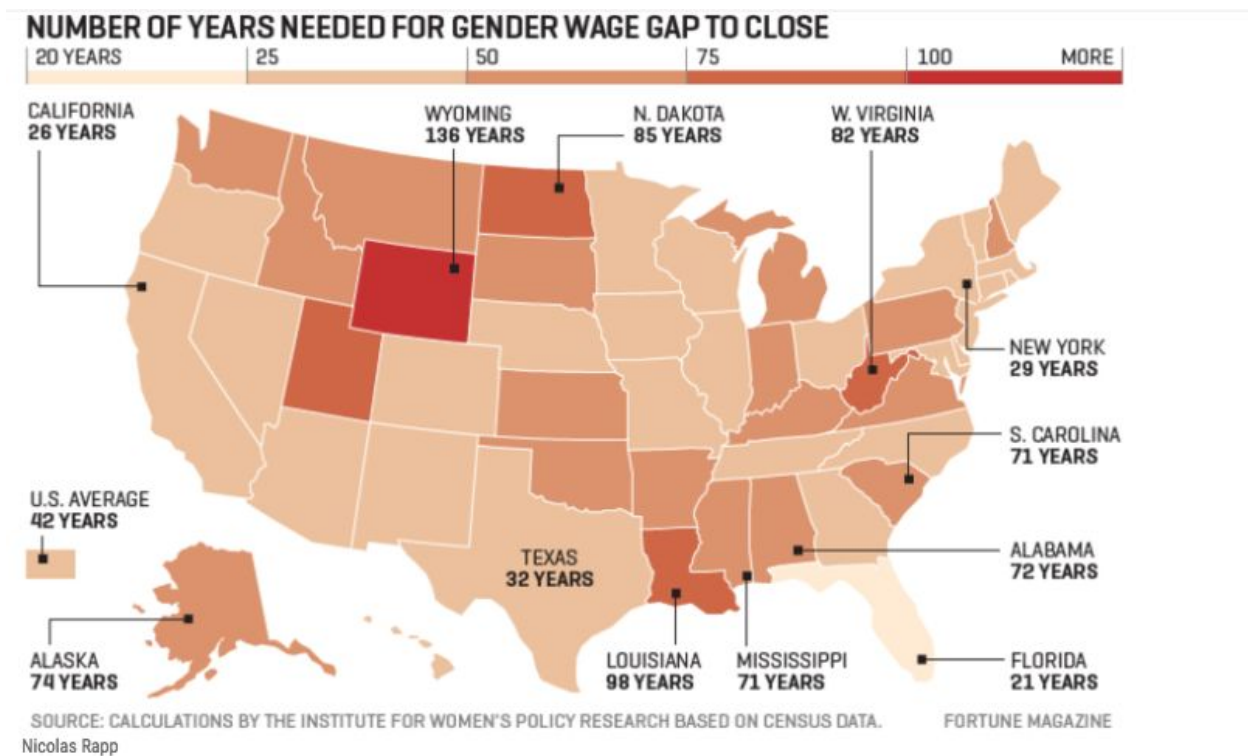# Don't Buy Into The Gender Pay Gap Myth

Karin Agness Lips, U30 CONTRIBUTOR
FULL BIO ∨
Opinions expressed by Forbes Contributors are their own.

Senate Appropriations Committee Chair Barbara Mikulski, D-Md., at podium, accompanied by fellow Senate Democrats, speaks during a news conference on Capitol Hill in Washington, Wednesday, Sept. 10, 2014, to discuss the Paycheck Fairness Act. (AP Photo/Cliff Owen)

Drilling down to the situation reveals the real root cause of why it is happening and why is this seems to be an issue getting resolved in recent times. A recent news from Fortune dated Mar 21, 2017, shows that how many years it will take for the United States to come to gender equal pay.

NUMBER OF YEARS NEEDED FOR GENDER WAGE GAP TO CLOSE

| 20 YEARS | 25 | 50 | 75 | 100 | MORE |

CALIFORNIA
26 YEARS

WYOMING
136 YEARS

N. DAKOTA
85 YEARS

W. VIRGINIA
82 YEARS

NEW YORK
29 YEARS

S. CAROLINA
71 YEARS

U.S. AVERAGE
42 YEARS

TEXAS
32 YEARS

ALABAMA
72 YEARS

ALASKA
74 YEARS

LOUISIANA
98 YEARS

MISSISSIPPI
71 YEARS

FLORIDA
21 YEARS

SOURCE: CALCULATIONS BY THE INSTITUTE FOR WOMEN'S POLICY RESEARCH BASED ON CENSUS DATA.   FORTUNE MAGAZINE
Nicolas Rapp

WAGE GAP

Here's How Long It Will Take for Each State to Give Women Equal Pay

According to one study by PRC

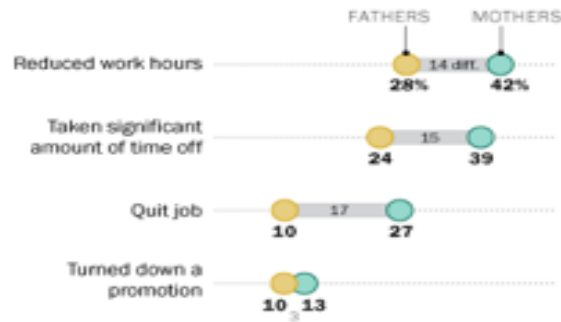**"Women more than men adjust their careers for family life"**
- Pew Research Centre

According to 2013 survey done by PRC shows that women more likely see career interruptions than men though in 2012 survey 79% Americans denied the notion of women in a traditional role of homemaker.

Mothers, More Than Fathers, Experience Career Interruptions

Mothers, More Than Fathers, Experience Career Interruptions

% saying they have ... in order to care for a child or family member

	FATHERS	MOTHERS
Reduced work hours	28%	42% (14 diff.)
Taken significant amount of time off	24	39 (15)
Quit job	10	27 (17)
Turned down a promotion	10	13 (3)

Note: Based on those who have ever worked. "Fathers" and "mothers" include those with children of any age, including adult children. Pew Research Center survey conducted October 7-27, 2013.
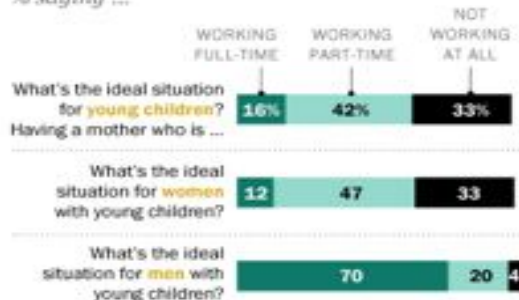
PEW RESEARCH CENTER

Though in 2013 many of them did not find a full-time working mom as an ideal situation for young Kids.

Very Few Americans Say Full-Time Working Mom Is Ideal for Young Children

Very Few Americans Say Full-time Working Mom Is Ideal for Young Children

% saying ...

	WORKING FULL-TIME	WORKING PART-TIME	NOT WORKING AT ALL
What's the ideal situation for young children? Having a mother who is ...	16%	42%	33%
What's the ideal situation for women with young children?	12	47	33
What's the ideal situation for men with young children?	70	20	4

Pew Research Center survey conducted November 28-December 5, 2012.

PEW RESEARCH CENTER

One result is that while 42% of mothers with some work experience reported in 2013 that they had reduced their work hours in order to care for a child or other family member at some point in their career, only 28% of fathers said the same. Similarly, 39% of mothers said they had taken a significant amount of time off from work in order to care for a family member (compared with 24% of men). And mothers were about three times as likely as men to report that at some point they quit a job so that they could care for a family member (27% of women vs. 10% of men).

Even TIME supports above claim by accessing data released by Bureau Of Labour Statistics.

TIME | Living

Getty Images

LIVING

Women Are Still Doing Most of the Housework

Alexandra Sifferlin
Jun 18, 2014

Women are still pulling more weight around the house than men, according to the American Time Use Survey data released by the Bureau of Labor Statistics Wednesday. However, men are starting to pick up the slack.

The BLS data reveal how much time Americans spent on various activities last year, from household work to leisure and sports -- as well as time spent providing childcare.

In order to proceed with the analysis , we have picked up certain dimension where women are or are not succeeding in combating wage gap. To achieve our goals we start with our strongest and major field which covers all the possible occupations that men and women pick. Below are the dimensions which we will be touching upon and draw the conclusion in helping the audience understand the situation at micro level:

→ Women/Men led occupations (owned completely by Mishita, Python:Ricken)

→ Hourly wage in these occupation (

→ Women in tennis world where they are getting paid equally

→ Women in entertainment industry and the trouble

→ Some fields where women earns more than men

→ According to above what are the right/wrong choices of jobs for women?

Domain: Gender discrimination is a vast topic and is almost an issue for each country on world map Some are suffering from more difficult problems. We keep our analysis restricted to the USA only though some part such as Sports touches up the data from worldwide tournaments. All of the data covers recently available data sets for almost current time and all of the created charts are dependent on the integrity of data.

Let's start
1. <u>Overview of no. of men and women in different kind of Occupation:</u>

Occupations pursued by Men vs Women

Occupations pursued by Men

Occupations pursued by Women

Data Source: https://www.census.gov/dataviz/visualizations/stem/stem-html/
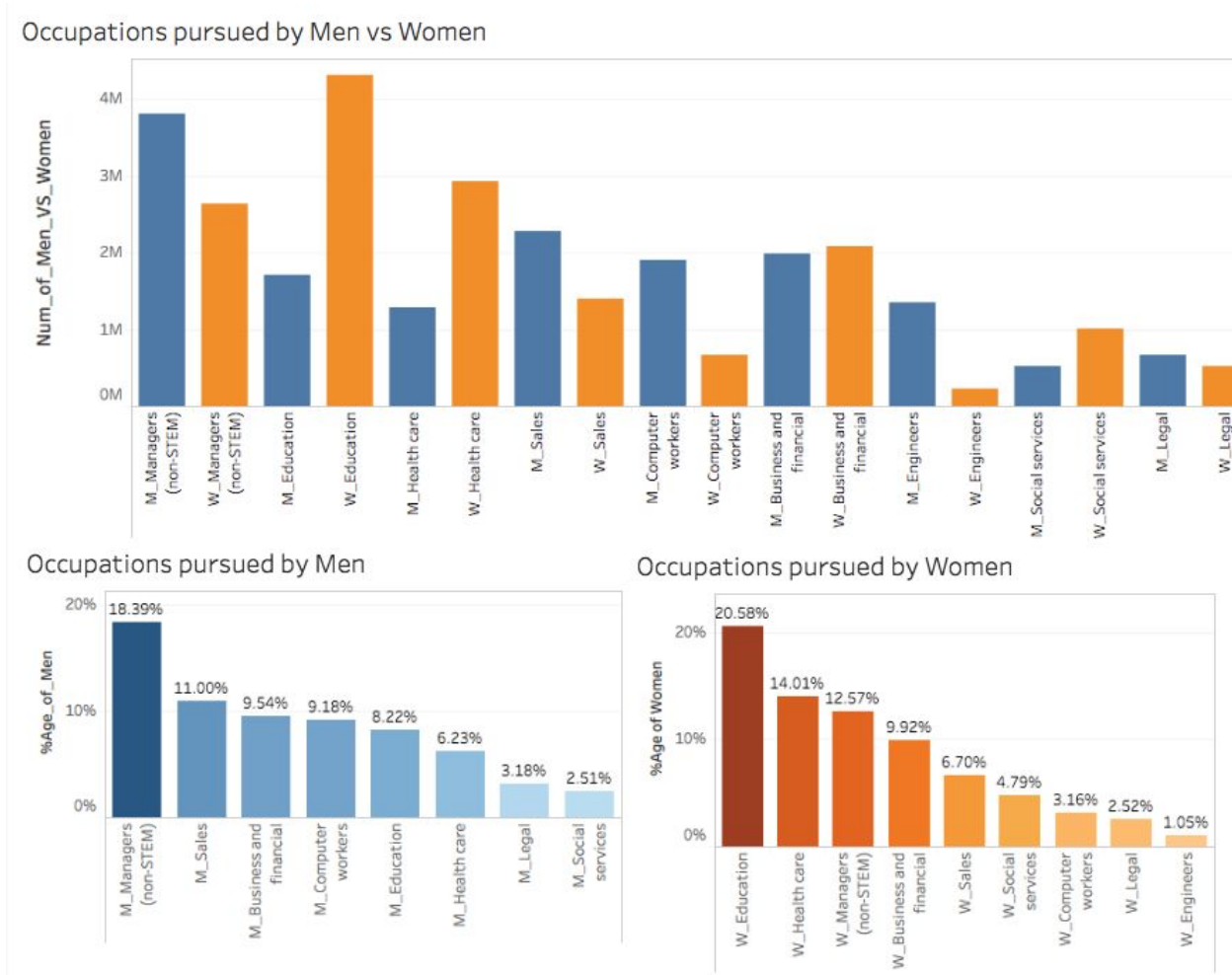
Claim: Women prefer non-corporate jobs over corporate jobs whereas men prefer corporate jobs over non-corporate jobs. Corporate positions include engineers, managers, computer workers, etc. Non-corporate positions include jobs in education, healthcare, etc.

Domain: The data for the above-shown visualization is collected from census.gov. The data set includes fields of degree and occupation of US population in the age group of 25 to 64 years. The data field is further categorized into gender and race. However, since our focus is on comparing the occupations pursued by men and women, we did not consider degrees. We used Excel tools and python for data wrangling and picked the gender wise data for Men and Women occupations. The other two charts show the proportion of men and women respectively involved in each occupation.

Audience: The main audience for the above visualization is the working population of United States.

What does this visualization convey?
The first chart shows the number of men and women in different kinds of occupations. The x-axis shows the type of occupations and Y-axis shows the number of men and women in the occupations. This includes several technical, corporate, and non-corporate jobs. A bar graph is used as a visualization tool where blue represents men and orange represents women.

Goal: The purpose is to show the distribution of the male and female population in various types of occupations. We want to show our audience if there is any field of occupation in which one of the genders dominates the other. If yes, what are the reasons behind it?

Why this is important: To understand the theory of gender pay gap, it is very important to know the overall breakdown of men and women population in various kinds of occupation. A person's pay depends on the type of occupation s(he) is in. Also, within an occupation, a person's pay is dependent on his/her position in the job hierarchy. For example, entry-level workers are paid significantly less than executives.

As seen in the above visualization, women are predominantly employed in education, health sector, business whereas men are predominantly employed in engineering, management, computing, etc.

We want on to analyze reasons behind it:

Warrant: Corporate culture signifies time-bound executions, deadlines, work pressure, round the clock involvement into projects and, hence, is much more demanding in terms of time and availability. Women usually being the primary homemaker and the secondary earning member of the family need to make a fine balance between their work life and home making which is much harder to achieve in corporate jobs than non-corporate ones. For example, a woman working as a teacher in a school can devote her time to her family much more easily than a woman working as a corporate executive. The above visualization shows that there are more male managers than women managers. If we observe the above visualization, we can clearly see the difference between men and women in occupations such as managers, education, and healthcare.

As mentioned in the article, women find managerial positions less desirable and the female managers sometimes have low satisfaction level than male managers. **Why is it so?**

The article snippet[figure 1] mentions the following reasons:

1.Women have the higher number of life-goals than men and give more importance to keep balancing their work-life schedule rather than to earn prestige and money, which they can achieve by holding top positions.

> Top level positions in organizations come with many benefits, from higher pay to more influence, prestige and power. But they also require a larger time commitment. For women, that time commitment is often viewed as the need to make tradeoffs between family and work activities. Promotions to top positions in an organization, in fact, often involve sacrificing free time for money. And women realize that's the case.
>
> In research my colleagues and I conducted, we find that when men and women are presented with the possibility of a promotion to a higher level position in their organization (i.e., they are given the opportunity to professionally advance), they find the position to be as attainable as men do, but less desirable. The reason is that they see the position generating not only positive outcomes (such as money and prestige) as much as men do, but also negative ones (such as tradeoffs they'll need to make and time constraints). That's where men and women differ: in how much they predict these negative outcomes will affect their lives. The tradeoffs and constraints women predict they'll experience when reaching high-level positions are related to the fact that, as we find in our work, women have a higher number of life goals as compared to men. In some of our studies, we asked different groups of men and women, from college

Figure 1 Why women may find management jobs less desirable. Data source: https://www.scientificamerican.com/article/women-may-find-management-positions-less-desirable/

The article snippet is shown in Figure 2 also lists the reason behind a high number of women taking up healthcare and education jobs. It says that women by their nature are more caring than men. Which is why we are seeing a lot of women engaging in jobs such as baby sitter or elder care taker.

However, some women may turn to teaching and healthcare jobs because of discrimination in their work-settings, and therefore, they tend to pursue their career in the job that emphasizes on care and engagement, even if they pay less as compared to other jobs.

Traditionally, Women Care More Than Men

A integral part of femininity, according to Folbre, is the inclination to care for others. Results of a study examining work preferences supports this idea: women tend to value family and relationships, and devalue money, more than their male counterparts. It has also been found that women may turn to female-dominated fields to avoid the harassment or discrimination rife in other work settings. Whatever their reasons, women as a groups are drawn to jobs emphasizing care and engagement—whatever the cost, in salary and stigma.

Femininity And Drive Aren't Mutually Exclusive

To us, this pattern is a little discouraging. It's admirable to do what you love, and certainly so to support yourself doing it. But to think that a woman might shy away from a job because she thinks she can't do it, or because she is experiencing gender discrimination, is heartbreaking. We know that a woman (being a person) is capable of making the decision to do whatever she wants, from taking the reins of her finances to entering a male-dominated workplace. Femininity may be based on caretaking, but it doesn't exclude independence.

Tell us in the comments: Why do you think some fields are so heavily dominated by women?

Figure 2: Why do women chooses job in nursing and teaching.
Data source: https://www.learnvest.com/2010/08/jobs-in-nursing-and-teaching-why-do-women-choose-to-earn-less

Now after looking at several male-dominated occupations, if we look at the "business and financial" occupation, surprisingly women are slightly higher in number than men.

Business and financial occupation cannot be put in either of the bucket (corporate or noncorporate), it lies somewhere in between the two and consists of jobs like small businesses, medium businesses, investment banking, etc.

The article snippet [figure 3,4] shown below indicates that, as of 2012, USA has around 9,878,397 women-owned businesses and out of these businesses, around 90% have no employees other than the owner. This clearly, explains the reason behind the large concentration of women in business and financial occupations.

1. Women engage in business and financial occupations because, they can enjoy time-flexibility and as a majority of them are handling their business single-handedly, they can manage their work-life balance more easily as compared to other corporate jobs, where a person must regularly report to his/her manager or handle his/her subordinates.

Women-Owned Businesses (WOBs)

NWBC Analysis of 2012 Survey of Business Owners

AS OF 2012:

★ There are 9,878,397 women-owned businesses[1] in the United States. That's an increase of 2,086,282 businesses, or 26.8%, from 2007. Of nonfarm and privately-held businesses, 36.3% are women-owned, in 2007, 28.8% were women-owned. Women-owned businesses generated $1.4 trillion in receipts.

★ In 2012, of these firms, 89.5% have no employees other than the owner. These firms have receipts of $229.2 billion. In 2007, 88.3 of women-owned firms were sole proprietorships with receipts of $182.2 billion.

★ The remaining 10.5% of firms employ 8,431,614 people in addition to the owner. In 2007, they employed 7,520,121 people in addition to the owner. In 2012, women-owned employer firms paid their employees $263.7 billion, a $47.0 billion or 25.8% increase since 2007. Women-owned firms with employees generated $1.2 trillion in receipts.

GEOGRAPHY:

Highest number of women-owned firms:		Highest percentage of women-owned businesses relative to men-owned and equally-owned:		Highest percentage growth of women-owned businesses:	
1. California	1.3M firms, 13.4% of WOBs	1. Washington, D.C.	45.2%	1. Louisiana	46.9%
2. Texas	866.7K firms, 8.8% of WOBs	2. Georgia	41.1%	2. Mississippi	46.5%
3. Florida	807.8K firms, 8.2% of WOBs	3. Maryland	40.1%	3. Texas	42.1%
4. New York	725.7K firms, 7.3% of WOBs	4. New Mexico	40.1%	4. Washington, D.C.	40.3%
5. Illinois	417.5K firms, 4.2% of WOBs	5. Illinois	39.0%	5. Florida	39.0%

Figure 3: Women in business-financial occupations.

Data source: https://www.nwbc.gov/sites/default/files/FS_Women-Owned_Businesses.pdf

Women start companies to better balance their work and family lives.

‹ 1/9 ›

Wealth is not their primary focus, so most remain smaller.

But there are exceptions, like Martha Stewart (Omnimedia), Ruth Furtel (Ruth's Chris Steakhouse), and Lillian Vernon, which make big money.

More: Startups   Features

Kirsten Jennings

Figure 4: Women in small businesses.
Data source:
http://www.businessinsider.com/battle-of-the-sexes-do-men-or-women-make-better-entrepreneurs-2010-11#women-start-companies-to-better-balance-their-work-and-family-lives-1

All the articles shown above provide us a valuable insight that why women are concentrated more in education and health care jobs. Even the jobs such as **"business and financial"** which have a higher share of women is because self-owned businesses though comes with a huge responsibility provides a decent time flexibility to women as compared to engaging in other occupations such as management, sales, etc and they can manage their work-life balance more easily by engaging in these occupations.

Rebuttal:

About Education industry:

The above-shown articles explain that women choose non-corporate jobs especially education because they are more flexible as compared to other jobs. So, does it imply that these jobs are not challenging and it's quite easy to fulfill job responsibilities in them?
The answer is no, teaching jobs are in fact very challenging and there are several reasons behind the large female concentration in this sector.
This article [figure5] clearly, shows that there are lots of responsibilities and burden
1. Though the time duration is less for teachers as compared to other corporate occupations, teachers must stay in the school later after the students left.
2. The job is not only confined to teaching the syllabus but teachers are also responsible for the students' overall development because students consider as their role models.
3. It requires a lot of patience to deal with students especially toddlers. It is certainly not an easy task for women to manage kids with so much patience while

maintaining the energy for the whole day. This also is a reason behind less number of men in education jobs.

2. Not only do you have your students to deal with, but also their parents.

Teachers not only deal with their awesome, but at times tough, students but also the parents that go along with them. Some parents are easy to talk to and get along with, but there are some parents that will give you a hard time... Their child can do no wrong, and therefore you must be at fault. In a lot of cases, the parents are more difficult than their children.

3. You do not have summers off.

Most people think that teachers have the summer to just relax and do whatever they want, but that is not the case. Most teachers take some time in the summer for themselves but for the most part the summer is spent preparing for the next year whether it be planning and figuring out what activities to do with each lesson or going to teacher workshops to learn new ideas and brush up on old ones. Teachers are always trying to better themselves so that the students have the greatest chance at success.

4. You are more than a teacher to most of your students.

Most of your students see you as more than just their teacher. You end up being their role model. Students look up to their teachers and see them as these amazing people. That might not always be the case right away, but eventually they will see how much you really changed their lives. Your classroom is their home away from home.

5. You attain teacher traits.

As a teacher you acquire traits, some of which others might find frustrating or annoying. You tend to correct everyone☐s grammar around you and try to turn everything into an educational opportunity. You also find yourself becoming more creative with outside activities and making the experience more interesting. As a teacher, you gain all types of traits each of which makes you a better person even if those around you do not think so.

6. The rules for being a teacher make it harder for you to do your job.

In this day and age teachers have to teach to the test. Teachers should not have to teach just so that the students can pass a test and end up absorbing none of the information. That is not what teaching is about and should not be what the profession has turned into.

7. You tend to do after school activities to help out your school.

Figure 5: Challenges in a teaching jobs
Data source: https://www.theodysseyonline.com/teacher-hardest-rewarding-careers

About Health Care industry [figure 6]

Secondly, although, the above visualization shows that %age of women (14.01%) is higher in healthcare as compared to Men (6.23%), this does not necessarily mean that this holds true for all the professions in the healthcare field. The following visualization shows that compared to women there are more men doctors, physicians, and surgeons in most of the specialties.
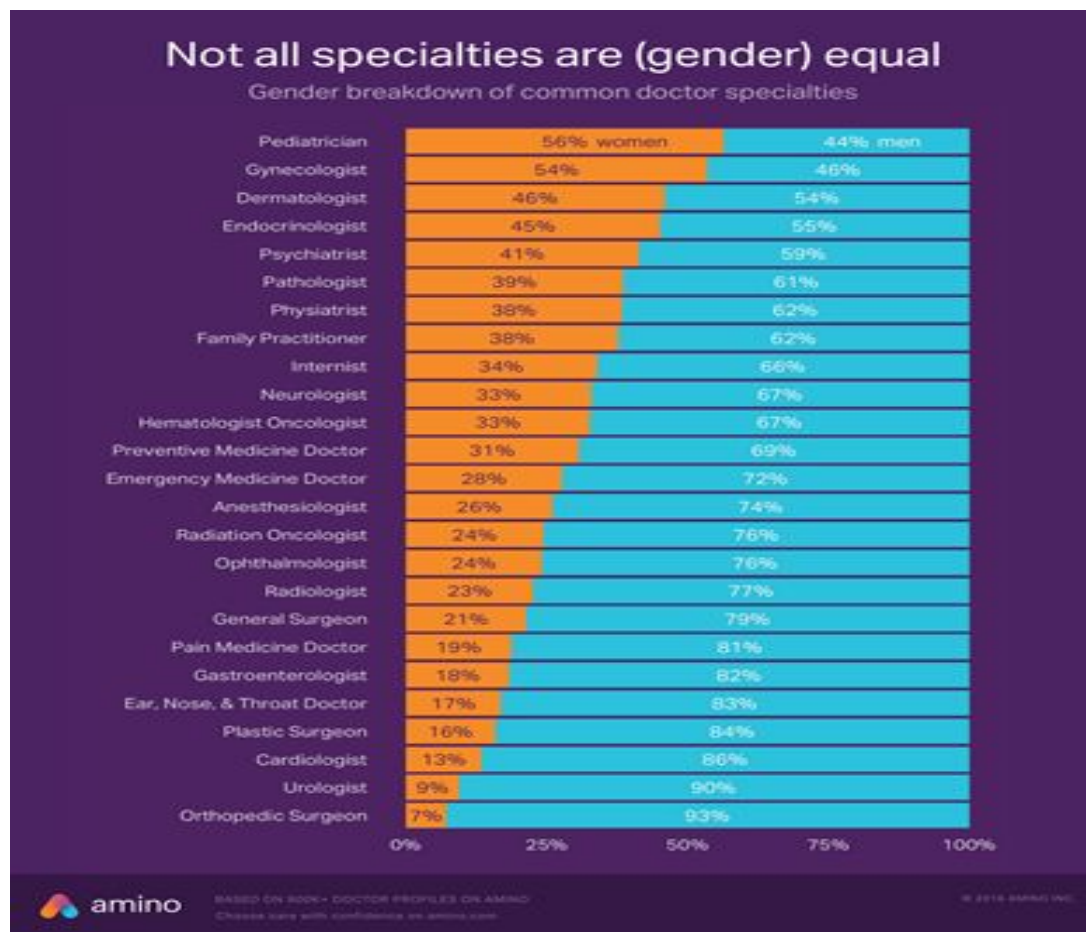
Figure 6: Engagement in Doctors specialities by gender
Data source: https://amino.com/blog/how-the-gender-gap-is-shifting-in-medicine-medical-specialties-by-gender/

However, women constitute a gigantic 94.2% chunk of the nursing jobs as shown in the subsequent figure [figure 7]. This explains the higher number of women in healthcare occupation than men.
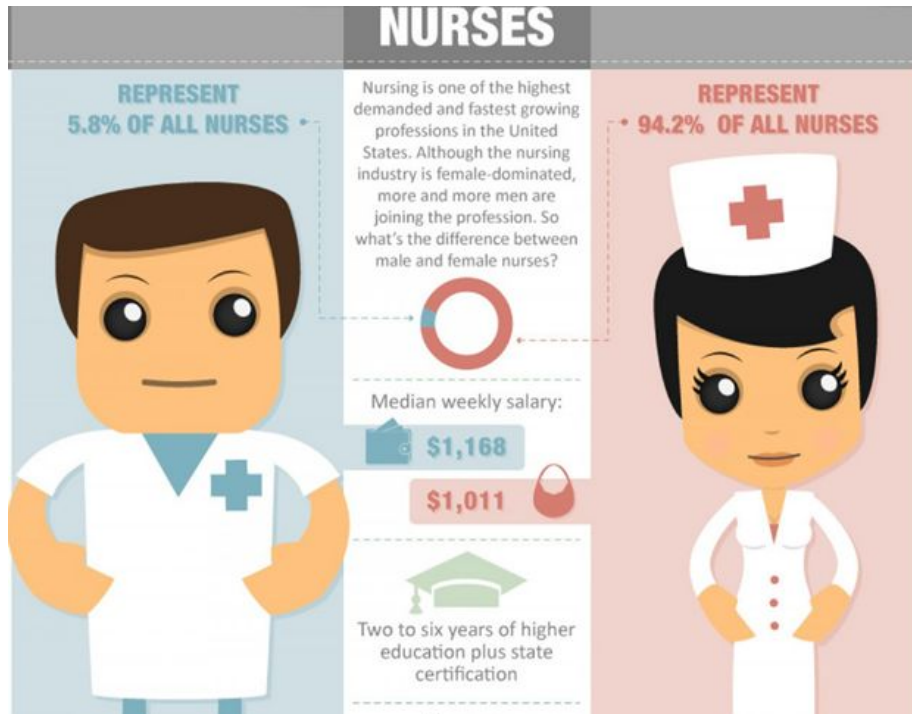
Figure 7: Men vs Women in Nursing occupation.
Data source: https://visual.ly/community/infographic/health/male-vs-female-nurses

As seen from the figure 7 above, despite being a meager 6% of the total nursing employees, men have more per capita earnings than women. The below snippet of the article [figure 8] provides us a reason:

The reason is there are more male anesthetists than female and median earnings of nurse anesthetists is more than twice the average earnings of overall nursing occupation. This explains the reason that despite fewer men in nursing, they earn more than women.

Highlights

- There were 3.5 million employed nurses in 2011, about 3.2 million of whom were female and 330,000 male.
- Of employed nurses, 78 percent were registered nurses, 19 percent were licensed practical and licensed vocational nurses, 3 percent were nurse practitioners, and 1 percent were nurse anesthetists.
- Men's representation among registered nurses and licensed practical and licensed vocational nurses increased. About 2.7 percent of registered nurses were men in 1970 compared with 9.6 percent in 2011. Men's representation among licensed practical and licensed vocational nurses grew from 3.9 percent in 1970 to 8.1 percent in 2011.
- In 2011, 9 percent of all nurses were men while 91 percent were women. Men earned, on average, $60,700 per year, while women earned $51,100 per year.
- Men's representation was highest among nurse anesthetists: 41 percent were men.
- Male nurse anesthetists earned more than twice as much as the average for men in all nursing occupations. Male nurse anesthetists earned, on average, $162,900 per year, while men's average for all nursing occupations was $60,700 per year.
- Even among men and women in the same nursing occupations, men outearned women.
- Women working as nurses full-time, year-round earned 91 cents for every dollar male nurses earned.

Figure 8:
Data source: https://www.census.gov/people/io/files/Men_in_Nursing_Occupations.pdf

Conclusion:

After seeing all the visualizations and various articles, it is evident that the above claim holds true. There could be several factors in deciding the income of any person, but certainly, one very big factor is the choice of occupation. We see above, that women are lesser in management jobs and even in non-corporate jobs such as healthcare, they are more engaged in nursing jobs instead of other doctor's specialties such as Surgeons and Urologists. Therefore, choice of occupation matters a lot and along with that, it is very important that in which particular stream a person is working.

2. **Average hourly pay in these occupation:**
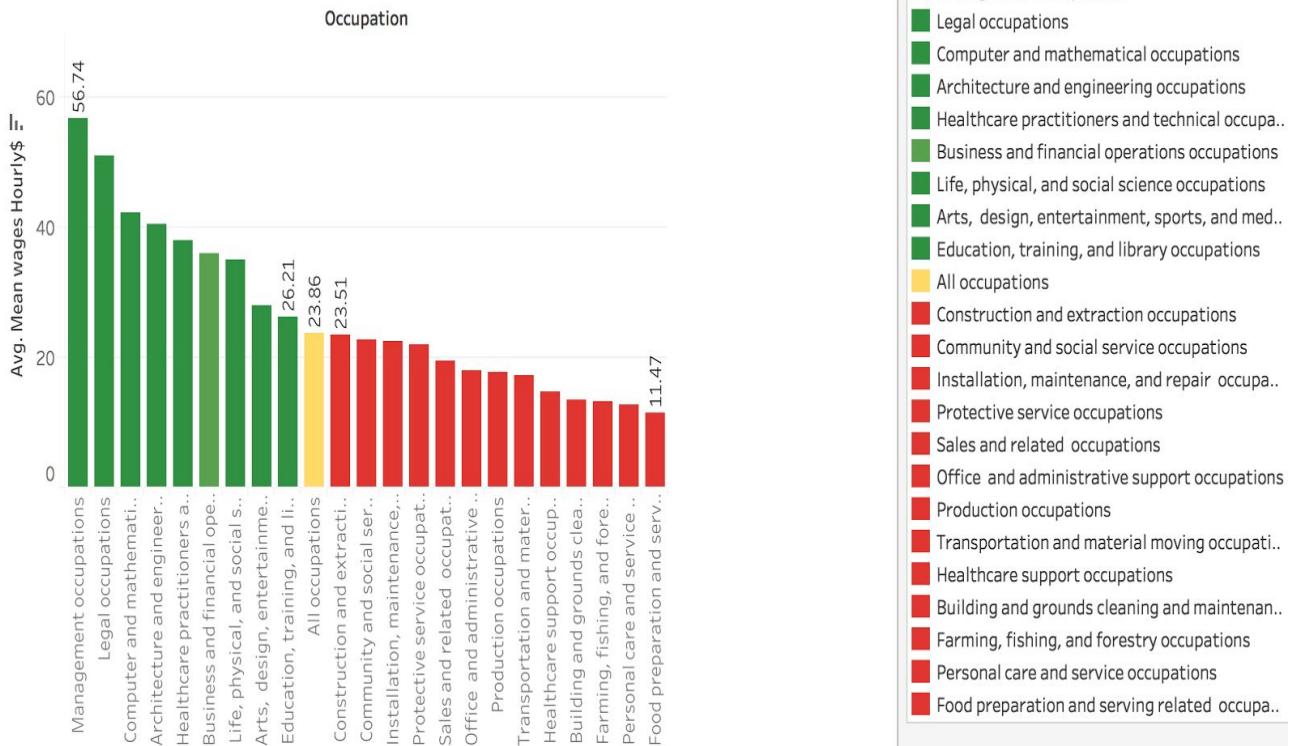
Data Source : Bureau Of Labour Statistics

The above data was taken from the Bureau of Labour Statistics (https://www.bls.gov/news.release/pdf/ocwage.pdf) This chart's purpose is to show some of the major occupations categories and their respective average hourly wages. The details about the what occupations come under each category are given in detail in the BLS news release. For the purpose of this project, we decided to study the major categories of occupations and the respective hourly mean pay. From the chart, we can see that the occupation category with the most pay is under the 'Management' classification of jobs with an average hourly pay of about 56.74$ which is more than twice the overall average pay (23.86$). The lowest average pay is for 'Food Preparation and Serving' classification while the 'Education, training & library occupation' and 'Construction & extraction occupations' have a little higher and lower pays at 26.21$ and 23.51$ respectively.

We wanted to showcase this chart to get an idea of what occupation pays how much without trying to see any sort of gender distribution in them. The reason being, we wanted to use this information to see whether women were taking up jobs in those industries where the pay itself is simply lower than the overall average pay. In such jobs, regardless of gender discrimination, women would anyways be getting a far lesser amount. If more women than men were pursuing jobs in the red side of the chart then the pay gap will only increase regardless of the additional gender discrimination factor that is in play.

3. __Where they are getting paid equally-sports:__
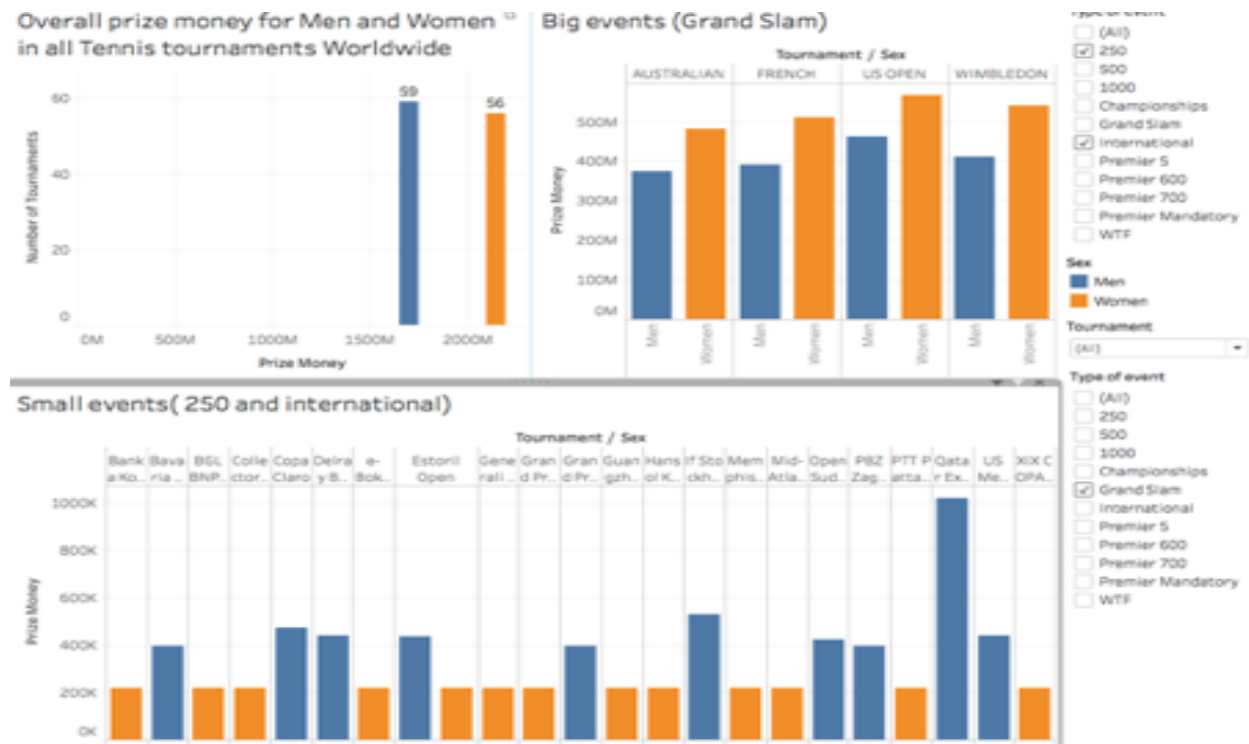
The above dashboard chosen represents the overview of prize money and number of tournaments played by men and women worldwide. Charts involve tournaments played worldwide for prize money earned from 2014.

The first chart (Overall prize money for Men and Women in all tennis tournaments worldwide) shows the total prize money for all the tournaments played gender-wise. For 56 such records, women earn more prize money than men for a total of 59 such records. The other two charts are the drill down of the first one. Overall prize money is equal for men and women but it doesn't hold true for all the tournaments. Hence taking a closer look at the type of tournament is important. The two chart shows the prize money gender-wise in the different type of tournament. The level of tournament plays an important role over here. Women earn equal to men only in big events. However, women earn lesser than men in small size events.

Warrant: To find out a field where in women are earning equally to men was the objective to look at the sports. In order to pick up fields, where women are getting paid equally, we took sports because mainly in sports gender influence is null if the sportsperson is popular. Serena Williams is the top performer in the game and is earning more than many tennis players. As people buy expensive tickets and number of tickets to watch popular players, it vanishes the impact. However, when it is not about any specific players, people still prefer watching male players over female players.
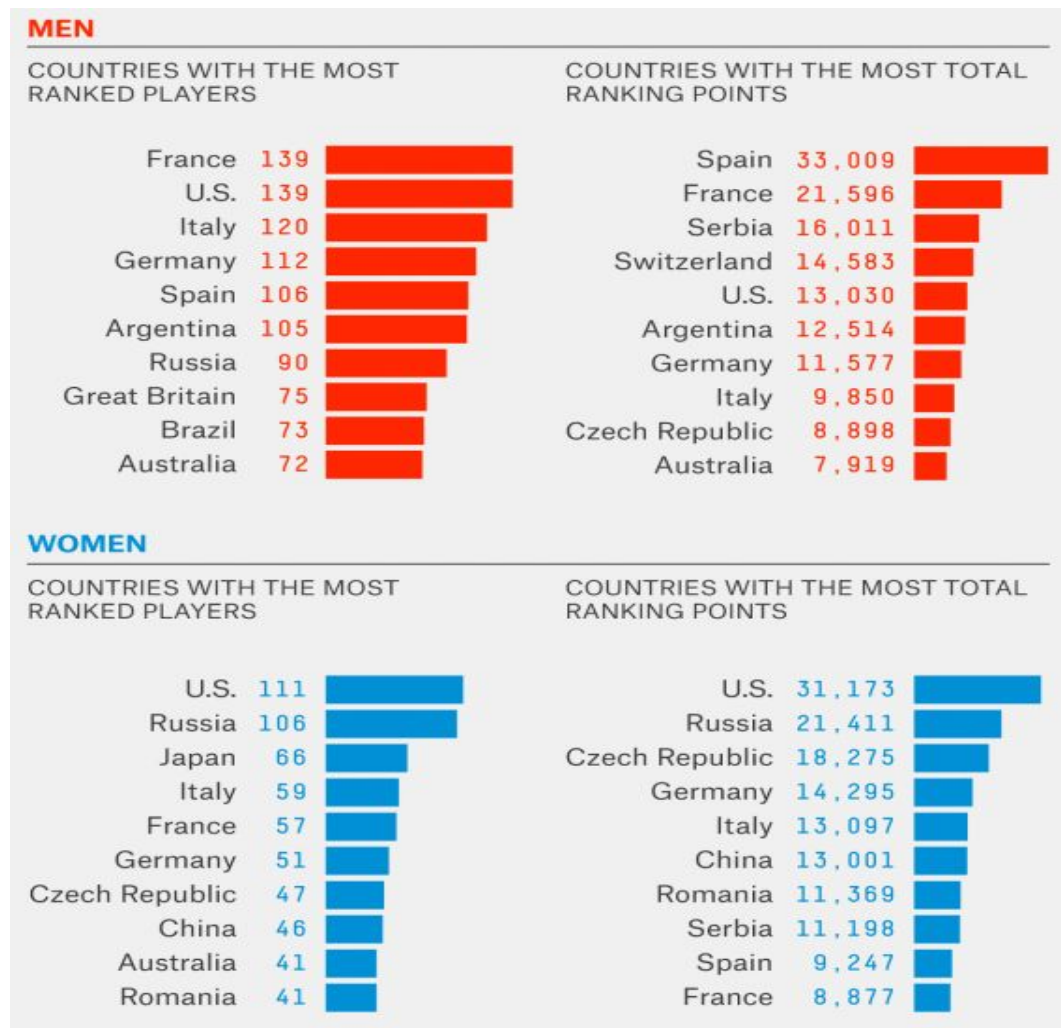
Choosing a different kind of tournaments: We have chosen to drill it by tournaments type to find out whether all kind of tournaments treated women equally. To know more about tournaments listed in our chart are the definitions by a blog from the cleaning lines:

For the purposes of elaborating on the chart's annotations, the tournaments break down into 5 categories.

1. **Grand Slams**. The four biggest tournaments in tennis are the slams, they are run jointly for ATP and WTA players and since 2007, all slams have awarded prize money equally between men and women (even if the US Open and Wimbledon award considerably more prize money per event, approximately USD 15m, than the Australian and French Opens, approximately USD 12m).
2. **ATP Masters 1000 and WTA Premier Mandatory events**. This group includes four tournaments. Two of these are joint ATP-WTA events run and award equal prize money (Indian Wells and Miami, approximately USD 4m for the ATP and WTA tournaments at each event); one is jointly run but bizarrely offers equal prize money with the exception of paying women a few thousand euros fewer in rounds 1 and 2 (Madrid). Each tour also has one other marquee event run separately. Both are in China – Shanghai for the men; Beijing for the women – and each offer singles prize money of over USD 3m.
3. **ATP Masters 1000 and WTA Premier 5 events**. Large differences in prize money kick in at this point while also exposing unequal prize money at joint events: Rome and Cincinnati are both joint events where the men's events award prize money of over USD 2.5m; while the women's events award under USD 2m. If, as Ben Rothenberg pointed out, there were tournaments that should commit to prize money equality, it is these two and Canada ("Canada" is also a joint event although its tournaments are held concurrently in different cities).
4. and 5. **ATP 500 and WTA Premier events / ATP 250 and WTA International / 125k events**. As a result of prize money increases on the ATP tour over the last few years, the vast majority of ATP tournaments provide greater levels of prize money that their equivalent WTA event.

Choosing Tennis over other sports: As our analysis focuses on the US choosing a sport which is equally popular in the US and worldwide was important. Although men and women are paid equally in figure skating and gymnastics, tennis is more popular and datasets are easily available. Additionally, US women are stronger

than men in Tennis world. This analysis is done by fivethirtyeight.com. Even time supports the claim by providing 5 reasons as to why tennis should keep paying men and women equally.

MEN

COUNTRIES WITH THE MOST RANKED PLAYERS		COUNTRIES WITH THE MOST TOTAL RANKING POINTS	
France	139	Spain	33,009
U.S.	139	France	21,596
Italy	120	Serbia	16,011
Germany	112	Switzerland	14,583
Spain	106	U.S.	13,030
Argentina	105	Argentina	12,514
Russia	90	Germany	11,577
Great Britain	75	Italy	9,850
Brazil	73	Czech Republic	8,898
Australia	72	Australia	7,919

WOMEN

COUNTRIES WITH THE MOST RANKED PLAYERS		COUNTRIES WITH THE MOST TOTAL RANKING POINTS	
U.S.	111	U.S.	31,173
Russia	106	Russia	21,411
Japan	66	Czech Republic	18,275
Italy	59	Germany	14,295
France	57	Italy	13,097
Germany	51	China	13,001
Czech Republic	47	Romania	11,369
China	46	Serbia	11,198
Australia	41	Spain	9,247
Romania	41	France	8,877

Backing: An analysis from the cleaning lines on prize money in ATP(Association of Tennis Professionals) and WTA(Women's Tennis Association). The graph represents equal prize money in grand slam events which decrease towards small events as ATP 250/WTA international.

ATP / WTA Singles prize money 2014, by tournament (logarithmic scale)
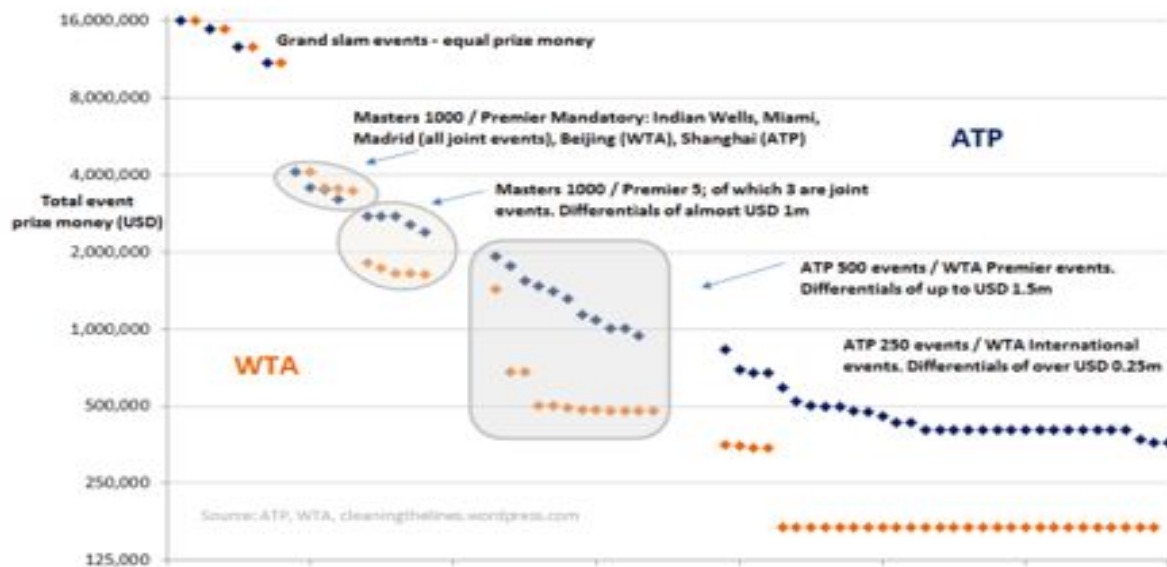
Rebuttal: A potential rebuttal in this visualization is that the chart shows the big picture. However, even Serena Williams got paid lesser in comparison to Novak Djokovic but the claim holds good for the US. Though the derivation of data is from worlds. Different kind of events considers female players worldwide which may divert the claim if only be considering players from the USA.

Conclusion: We can conclude after considering the warrant, backing, and rebuttal for the claim, that sports still seem to be a right choice for women and they should aim for big events. Sports are mainly popularity driven field and as the data shows that sport is one field where women are getting succeeded. A number of women should be encouraged to take part in that. However, a whole focused analysis specifically in sports which covers many kinds of sports would be more helpful in representing women in sports. Above charts are used as supporting charts to the main claim that women picked up wrong jobs and if chosen sports what they should aim for.

4. Where they are not getting paid equally(Hollywood movies)

Top paid Actors in Hollywood Movies (Male and Female)

Top Earning Actors & Actresses

Movie Star	2015 Film Credits
Robert Downey Jr.	Avengers: Age of Ultron
George Clooney	Tomorrowland
Dwayne Johnson	Furious 7; San Andreas
Leonardo DiCaprio	The Revenant
Matt Damon	The Martian
Jennifer Lawrence	Joy; The Hunger Games: Mockingjay ..
Daniel Craig	Spectre
Scarlett Johansson	Avengers: Age of Ultron
Vin Diesel	Furious 7
Melissa McCarthy	Spy

Total Compensation

http://time.com/money/4207416/hollywood-wage-gap/

Above chart is from TIME article on the hollywood wage gap. The data for the chart is taken from HTML page.The chart shows the top 10 paid actor/actress in Hollywood for their recent movies done. From the chart, we can clearly pick up that Jennifer Lawrence is the highest paid actress among others and if we compare highest paid female actor's compensation with highest paid male Actor Robert Downey is it almost half of it. It immediately raises a question mark on the entertainment industry for women. Above chart is just to give an overview to the audience of what Hollywood looks like when we talk about Gender pay gap.

27

Annual Earnings in Entertainment

The statement derived from above charts holds good in Hollywood years over years. A span of 6 years in the graph above shows that women have always earned lesser than men in the entertainment industry. The chart represents annual earnings in the entertainment industry for male and female actors. It helps us to find out a big picture of how the entertainment industry is keeping their share in Gender pay gap.

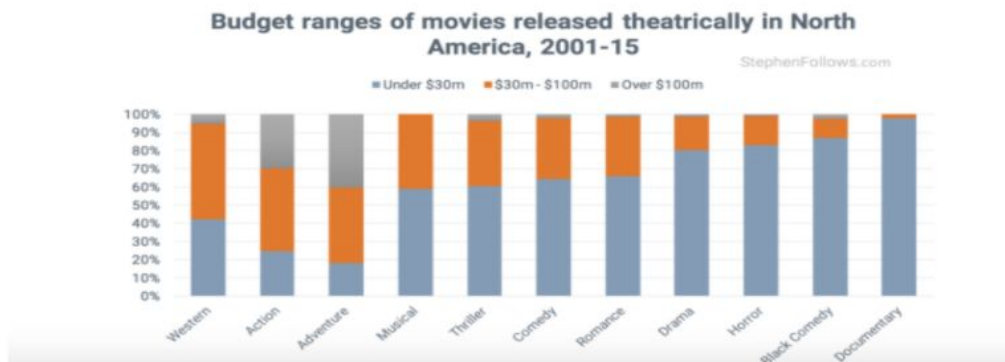## Share of Women in Films - By Genre
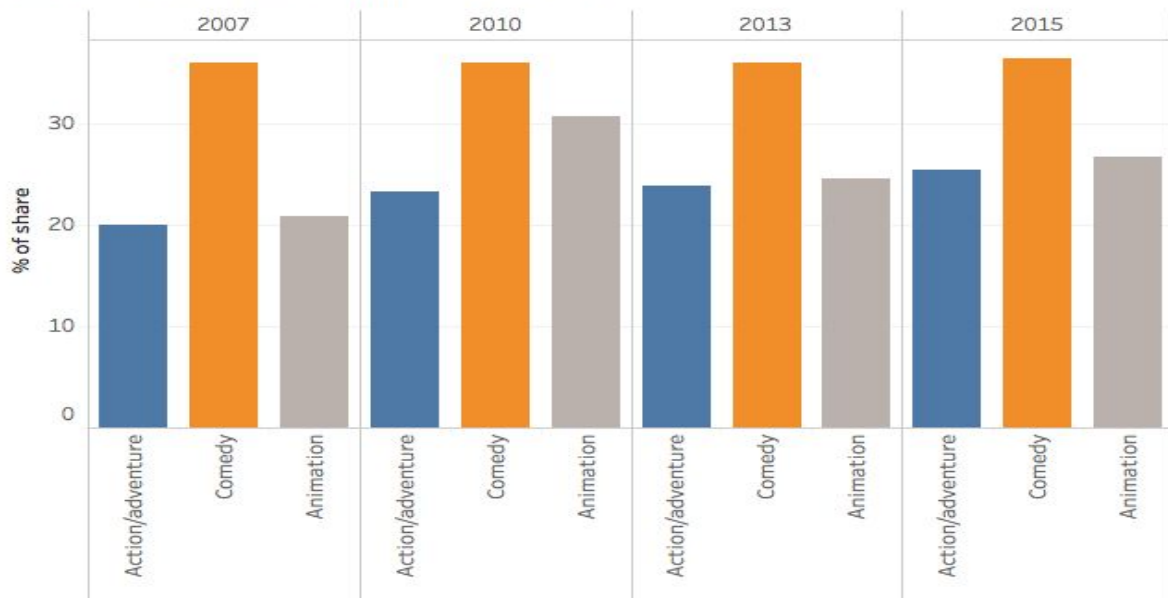
To drill down in the situation we have gone further to look what is the percentage of female involves in the different genre of the movie. Looking at the different year in the different genre we can say that women consistently are involved more in Comedy genre which(according to Ayesha includes romance and romance comedy) which mostly are called average budget movies. Let us have a look at the budget of these movies to drive our analysis.

Average Budget of these movies according to Genre
Which genres are most commonly budgeted between $30m and $100m?

Let's start by looking at what types of movies are typically in the $30m to $100m budget range. The chart below uses data from The Numbers to show all movies released in North American cinemas between 2001-15 for which there are publicly-available budgets. The genres have been sorted so that the ones on the left have the greatest percentage of $30m – $100m movies.

Budget ranges of movies released theatrically in North America, 2001-15

https://stephenfollows.com/films-make-money-pt2-30m-100m-movies/

According to Stephen (Stephen Follows Film Data and Education)
"The chart above uses data from The Numbers to show all movies released in North American cinemas between 2001-15 for which there are publicly-available budgets. The genres have been sorted so that the ones on the left have the greatest percentage of $30m – $100m movies."

We took help of this chart to find out the average budget in these movies as women pick up more of romance, drama, and comedy. Average budget of mentioned categories is under 30 million dollars which actually showcase the real pictures. Mostly actors get their compensation according to the budget of the movie. A high budget movie tends to pay more to the actors and this dimension adds up to the gender pay imbalance.

Warrant: We tried to drive out an analysis of top actors, Choices of the genre by female actors, movie budget and overall analysis of compensation over some years. Years involved in analysis are limited to the dataset availability. However choosing a flow which could justify that why women are consistently picking up movies that do not pay well. An additional catalyst to the scenario is Jennifer Lawrence case where gender discrimination is prominent because of the genre, popularity, lead role matches to the top movies done by male actors.

According to forbes :
https://www.forbes.com/sites/natalierobehmed/2015/10/13/jennifer-lawrence-speaks-out-on-making-less-than-male-co-stars/#7b32b61f223b

Jennifer Lawrence Speaks Out On Making Less Than Male Co-Stars

Jennifer Lawrence, the world's highest-paid actress, banked $52 million last year--$28 million less than the world's highest-paid actor, Robert Downey Jr. While neither are low on dough, Lawrence has been short-changed in comparison to her male co-stars--and she is finally speaking out about it.

Backing:
https://www.forbes.com/sites/maddieberg/2015/11/12/everything-you-need-to-know-about-the-hollywood-pay-gap/#5384ae355cf1

Forbes supports the claim by taking up the issue from big screen to small screen while digging up behind the camera scenes as well. Even time accepts that gender wage gap persists in Hollywood and why Hollywood should care about it. The topic is very well documented and published.

Rebuttal: A potential rebuttal here is not drilling down the situation to lead role and screen time. These two dimensions bag the most potential driver towards compensation. Taking an example of Jennifer Lawrence for one movie in comparison to a large sample of action movies done by male actors questioned the analysis. According to the Guardian on the same issue reveals that Lawrence is getting paid more than her co-star for movie passenger which clearly takes on our claim.

Forbes recently ranked Lawrence as the highest-paid female actor of 2015. Since the Sony leak, Lawrence made headlines for negotiating a higher salary than Chris Pratt, her co-star in the upcoming blockbuster Passengers. Pratt will earn $12m for the film, while Lawrence will net $20m upfront or 30% of the film's profits.

Another rebuttal in the analysis is claiming for women picking up romance genre, this might be the case that they are only offered such movies because of their appearance as people find them more beautiful and appropriate for such roles.

Conclusion: Lawrence herself accepted her as a bad negotiator, going by which we can conclude that women need to be more smarter while working in entertainment industry. Voluntarily picking up low budget movie is certainly adding up towards the issue. A good negotiation and aiming for high budget movie will certainly helps women working in entertainment industry.Certainly genre wise analysis helped us to look where women are going wrong. Women works more in low budget movies as compared to men which in turn lowers down the compensation for whole industry. Even directors can help creating more female centric movies so that women can pick more of lead roles in movies. The hUnger games is a positive start and we look forward for more of these movies that breaks the stereotype of woman being good in chick-flicks.

5. Right/Wrong choices of jobs for Women

Men still make more than women in most professions -- considerably more in some occupations than others, according to a new study by the job-search site Glassdoor.The study, based on more than 500,000 salary reports from its users, compared the pay of men and women with the same job title, at similar companies, in the same state, with similar levels of education and experience. Even after making this apples-to-apples comparison, though, women still get paid less, earning on average about 95 cents for every dollar their male colleagues were paid, according to Glassdoor.

In every industry, women are paid less on average than men for doing the same work — but that isn't to say men out-earn women in every occupation.

If you want to try to narrow the pay gap between women and men, being a woman, there are some professions, you should try to avoid or try to consider.

Wrong Choice of Jobs of Women

Occupation

Occupation	Woman's earnings
C-Suite..	72%
Chef	72%
Computer programmer	72%
Dentist	72%
Psychologist	73%
CAD designer	78%
Pharmacist	78%
Physician	82%
Optician	83%
Pilot	84%

Man's earnings

Woman

Right Choice of Jobs of Women

Occupation

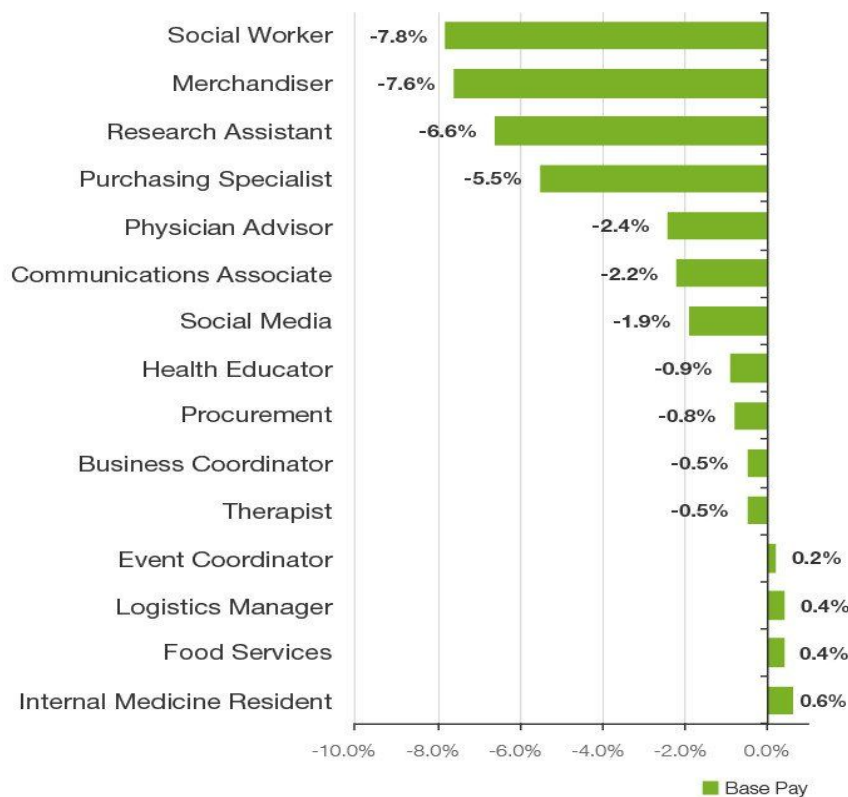| Occupation	Woman's earnings
Merchandiser	108%
Social worker	108%
Research assistant	107%
Purchasing specialist	106%
Communications associate	102%
Physician advisor	102%
Social media	102%
Business coordinators an..	101%
Health educator	101%
Procurement	Man's earnings

Woman

Warrant:

According to Forbes Ultimately, men remain the top earners in America, on average and by occupation. Men also hold the majority of leadership positions. Women are just 3% of chief executives at the largest 1000 U.S. companies.

https://www.forbes.com/sites/jennagoudreau/2011/03/14/jobs-where-women-earn-more-than-men/2/#65df1946dec1

According to Business insider:In some instances, based on the job held, the gender pay gap shrinks to a base pay difference of 0.2%, and women earn virtually the same amount as men. And in very few instances the gender pay gap is actually reversed.

http://www.businessinsider.com/the-only-jobs-where-women-earn-more-than-men-

2016-4/#-1

Bottom 15 U.S. Occupations by "Adjusted Gender Pay Gap (Percentage Higher Average Male Pay)

Occupation	Base Pay
Social Worker	-7.8%
Merchandiser	-7.6%
Research Assistant	-6.6%
Purchasing Specialist	-5.5%
Physician Advisor	-2.4%
Communications Associate	-2.2%
Social Media	-1.9%
Health Educator	-0.9%
Procurement	-0.8%
Business Coordinator	-0.5%
Therapist	-0.5%
Event Coordinator	0.2%
Logistics Manager	0.4%
Food Services	0.4%
Internal Medicine Resident	0.6%

Backing:
These women-make-more professions are female dominating and are more flexible to ask for a leave. Women intend to choose these professions to work as well as taking care of the family.
Rebuttal:
According to INVESTOPEDIA:
When considering the significance of any pay gap, the pay rate in occupations also needs to be considered. When a male computer programmer earns an adjusted 28.3% more than a woman programmer (as the Glassdoor study found), the bonus in his paycheck will be a lot bigger in real dollars than that of a woman social worker who earns 7.8% more than her male counterpart.
http://www.investopedia.com/articles/personal-finance/010717/10-jobs-where-wo

men-earn-more-men.asp

Conclusion:
Although the women-make-more list is refreshing, it's true that the pay gap is much more significant in the roles for which men are paid more — for instance, topping that list is "computer programmer," for which women earn $0.72 for every dollar men make.
The largest contributing factor is something called industry sorting. Women make up only 26% of highly paid chief executives but 72% of lower paid jobs like cashiers. Previous research, according to the Glassdoor study, suggests that this is partly due to social pressure that sorts women and men into different college majors and career tracks. Additionally, women tend to take on a larger share of child and elder care, causing them to look for jobs with more flexible schedules – which come with lower pay. The study found that the discrimination itself, age and experience are a much smaller factor in pay inequality. Making affordable child care and elder care more accessible could help even the playing field for men and women so that women can have the freedom to choose more professions.
The ultimate goal is to live in a world where men and women make the same amount of money for the same amount of work, no matter what field they choose to pursue.

Goals Achieved:

What is happening: Gender pay gap is an issue in USA and lot many organizations, communities are criticizing the issue. It is considered to be upsetting women in different occupation and industries.

Why it is happening: Women are considered to be more involved in their families, kids, household work or do not get the opportunity to perform due to some limitations(example-entertainment). Women face more interventions in their career and even they opt for jobs that are more flexible in terms of working hours in comparison to the jobs that requires high commitment towards their career.

What can be done: Women and social organization can be made aware to boost up women and their morale by showing them the real picture and their mistakes in picking up jobs and opting for relevant education. Women should not pick the wrong jobs or use good decision making, negotiation skills, more risk taking to wipe out the difference in wages.

Objective dimension of claims:

What the visualizations created describes: All of the charts represent the supports the claim by drilling down the situations and the root cause. The analysis is concerned with women working in the USA. The timeline of the analysis considers the current time and its situation to the best to derive its derivation. Specific timelines for each chart is explained below the charts.

Visuals explain the how and why questions: All the supporting charts used for deriving the conclusion. The charts tell that how women are getting pushed back and if they are paid less in the particular industry why it is so?For example taking up more flexible jobs or getting more into education reduces the overall number as average hourly pay in this occupation are less.

What can we decide through these visualizations: We do not claim to predict any situation or use our analysis to do so however a supporting article from Fortune predicts the number of years taken by each state to combat gender wage gap. However, from our analysis, we do prescribe some job advice. We make our audiences aware of the key drivers that promote this difference and warn them to not become the victim of the issue.

Subjective dimensions of visualizations created:

Truthful: We depend upon data sources available and cannot take the guarantee of them being 100% true. However, we did our best job to not create any visualization that could lead to a false perception.

Functional: Keeping in mind that we are creating a story for general users we keep the dimensions in mind and created the chart in simple English language that is mostly understood. All the validation of claims are supported by backing and Toulmin's model has been used for almost all the argument analysis.Additionally a strong documentation with all the references and explanations. Visualization is available over Tableau public which increases the ease of accessibility.

Beautiful: Our charts are simple and follow a consistent color coding. This could be a possible reason not to attract everyone in the same manner but keeping a standard in mind we tried to justify it to the general public.

Insightful: As it is very specific to an audience we cannot claim this to be very insightful. However, we know that some dimensions may seem very new to users. Drill down charts bags more chances of being insightful to users. For example, the presentation in class is a sample that not many people accept it and they found it very surprising.

Enlightening: As this issue is a very well documented, argued, published and popular in the USA. This might not be very enlightening because this analysis becomes one in the herd of already existing analysis over it. However, one may become aware of issues faced by women in the specific industry and may make them prepare before facing such situation in future.

Key considerations for Aesthetics:

Below are some considerations that we kept in mind in mind while creating these charts. All of the choices involve key drivers that involve Audience, context, and domain of topic.

Choosing bar charts consistently: As all our charts are the direct comparison among women and men in different fields we use bar charts to provide the user a better ability to compare and contrast.

Overview first, details later: We started with an overview of key metrics for men and women and then drill down the situation by picking one or two metrics from the charts.

No unjustified beautifiers: Not by making charts fancy and use of different types of bar charts. A consistent approach bind user to think that he is seeing the subparts of a topic.

Standard colour coding: The color chosen in all the charts for representing men and women is standard and even charts from other sources also blended with the color. For example, the supporting chart for WTP and ATP prize analysis comes from a blog but uses same color coding.

Use of numbers: Wherever it is important to catch the focus of audience, we used absolute numbers. For example percentages in the first chart of occupation, average hourly wage and in right/wrong choices of job charts.

Not by playing around visualisations: As none of the team members is an expert in Tableau we tried keeping our charts simple and did not play with visualization in order to avoid creating deceptive charts.

Potential Improvements consideration for future version:

1. An improved next version will have an interactive dashboard that can enable a user to pick dimension as per their interest.
2. We need to pick a more detailed analysis in all the occupations that we choose. As all of these occupations covers a wide range of roles, positions, and related pay.
3. An improved version will also have a predicted analysis by showing a growth of pay wage over the years to analyze occupations that are covering the gap well. As for Hollywood Jennifer Lawrence did a better job in next movie.We need more of such example and a time analysis to rate the occupation over a scale of good/bad indicator for women.
4. Dividing the whole topic into a sub-topic will help to focus on to more realistic situation with more numbers.

Limitations: Below are the limitation and challenges that we faced in carrying out the analysis

Finding datasets: This topic is very convoluted and sensitive and finding out datasets related to wage is little difficult. Lots of data sets involve female data with race and color. Finding out discrete datasets on all figured out dimension was a difficult task. Lot many datasets were mimicked and cleaning them in python was difficult.

Lack of expertise: No team members have specific expertise in dashboards and scorecards. Hence all of the analysis, visualizations and python cleanings have been done with a basic understanding and learning from a class concept. A complex analysis could have presented a better picture.

Time: 8 weeks of time is little tight for this project topic, we decided to start out the project with the more vast topic of women empowerment but then narrowed it down only to the one metric. There are lot more dimensions to cover on this topic.

Coordination: As five team members were conducting specific analysis and different parts of subtopics, coordination became an issue in setting up meetings and standardizing charts.

Integration: Integration task was very difficult. Yuan was responsible for integration and replicate the charts presented in class presentation. To wipe out any difference in any chart was difficult. The dashboard used for tennis claim was changed by Ricken on the final day of submission, till then the documentation was done on the previous dashboard(class presentation). He created the chart again so Tableau public has the different chart but I could not change my analysis of charts and conclusion. Both of the dashboards are different.

<u>Ownership:</u>

Below are the contents that have been written by each team members in this document and they bear the responsibility for any content that they have written:

Mishita Biyani

Overview of no. of men and women in different kind of Occupations…..

References…………………………………………………………………..

Ayesha Ajmal

Average hourly pay in these occupation…………………………………

References…………………………………………………………………..

Shuyuan Yang

Right /Wrong choices of jobs for women………………………………..

References…………………………………………………………………..

Purnima Tripathi

About the project…………………………………………………………..

Claim…………………………………………………………………………

Audience……………………………………………………………………

Resources and Tools………………………………………………………..

Data Sources- compiled in document by me but provided by team members

Objective……………………………………………………………………

Domain………………………………………………………………………

Where they are getting paid equally:Sports………………………………

Where they are not getting paid equally: Hollywood……………………

Goals Achieved……………………………………………………………..

Analysis of Objective dimension of claim………………………………..

Analysis of subjective dimension…………………………………………

Key Consideration for Aesthetics…………………………………………

Potential Improvements consideration for future versions……………….

Limitations…………………………………………………………………..

References……………………………………………………………………

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