Scholarly Contributions – Professor Miriam Marcowitz-Bitton

For the past five years, my scholarly agenda has focused on several major subjects. In addition to thorough research into the regulation of innovation and gender and racial gaps in patenting and trademark prosecution in Israel and the U.S., I have also undertaken an exploration of innovation policy during pandemics; studies of the regulation of the pharmaceutical sector in Israel and its impact on drug pricing; the design of the patent system; regulation of book markets; commercialization of government data; IP securitization, and more. The following discussion will touch upon only a few of my major contributions to date.

The Gender and Racial Gap in IP Registration. My most significant contributions in recent years are reflected in empirical and theoretical studies of the regulation of innovation and of trademark prosecution. My studies focused on Israel and the U.S.

In a recent project, my research team was the first to examine empirically the extent to which women and minorities succeed in prosecuting trademark applications before the United States Patent and Trademark Office ("USPTO"). We analyzed whether trademark prosecution reflects systematic underrepresentation of women and minorities similar to those reported in patent and copyright prosecution. We found that trademark data shows less significant disparities than found in the other two federal intellectual property ("IP") regimes. Our analysis revealed that women regularly secure trademark registration at a higher rate than men. Although we found that women are underrepresented in the pool of trademark applicants as compared to their representation in the population as a whole, we found that only some racial or ethnic minority groups are underrepresented and that the disparities are decreasing faster than in other IP registration systems.

In two other major studies, we also studied the gender gap in academic patenting in the U.S. and Israel. The gender gap in academia has long been the focus of public discourse regarding the role of universities in promoting social values. In a study that explored the U.S. academy, we considered women's participation in transferring knowledge from the academy to industry through the registration of patents for inventions developed through scholarly research. Our study yielded several key findings. First, we found a significant increase from 2000 to 2015 in the number of patent applications originating from universities. We identified a similar increase in filings by inventor teams comprising only women, though these applications were granted at a lower rate, and were cited less frequently, than patents obtained by teams that included men. We also observed that women are much more likely than their male counterparts to work alone, rather than as part of inventor teams. The article concludes that while women increasingly participate in academic patenting, a significant gender gap persists. Our findings serve as a springboard for further research on what underlies the failure to achieve gender equality in this area, even as women's representation in the academy continues to increase.

In another study, my research team studied the gender gap in academic patenting in Israel. We compared women's and men's participation in patent filing activity in Israeli academic institutions. Our study yielded several key findings. We found that women file patent applications far less often than men. Additionally, we found that women are outnumbered by men in joint applications naming inventors of both genders. The study also found that women's involvement in patenting activity in the academic sector was significantly lower than men's, considering women's representation in STEM faculties in Israel. We found that while the share of patent applications filed by men was higher than their representation in academic positions, the share of patent applications filed by women was much lower than their representation in academic positions. Nevertheless, our analysis revealed that applications naming male, female, and mixed-group inventors had comparable acceptance rates, and that there was no meaningful gender-based distinction when it came to the scientific field of the invention or forward citations.

In another project, we used qualitative methodologies to examine empirically technology transfer policies in Israeli academic institutions. The study offers a comprehensive look at the Israeli academy through a series of interviews with the CEOs of university technology transfer companies, university researchers, and other major players in the world of academic technology transfer. The study uncovers major findings regarding the wisdom of the current technology transfer scheme in Israeli academic institutions while also making recommendations for bettering the Israeli system.

In addition to the empirical contributions described above, I have also considered possible ways to remedy the gender gap in patenting and investigated other problems within the patent system. In one major contribution, I proposed the introduction of unregistered patents as a means of remedying several of these problems, including the gender gap in academic patenting. Unlike copyright and trademark law, which allow for both registered and unregistered rights, the patent system grants rights only to those who register their inventions and undergo subsequent examination. If the patent system adopted the two-tiered approach of copyright and trademark law, and implemented a regime of automatic, but very limited, unregistered rights in addition to fuller, registered rights, it could address the challenge of overprotection of low value inventions and underprotection of inventions by women and minorities. By offering automatic rights without the necessity of the resource-intensive registration and examination process, unregistered patent protection could also help women and other disadvantaged inventors gain greater access to some patent protections.

Most recently, we employed machine learning and natural language processing tools to extract hidden information from the words in patent applications. Through these methods, we found that inventor gender can often be identified from textual attributes—even without knowing the inventor's name. This ability to discern gender through text suggests that anonymized patent examination—often proposed as a solution to mitigate disparities in patent grant rates—may not fully address gendered outcomes in securing a patent. Our study also investigated whether objective features of a patent application can predict if it will be granted. Using a classifier algorithm, we correctly predicted whether a patent was granted 60% of the time. Further analysis emphasized that writing style—like vocabulary and sentence complexity—disproportionately influenced grant predictions relative to other attributes such as inventor gender and subject matter keywords. Lastly, we examined whether women disproportionately invent in technological areas with higher rejection rates. Using a clustering algorithm, applications were allocated into groups with related subject matter. We found that 85% of female-dominated clusters (over 50% women inventors) have abnormally high rejection rates, compared to only 45% for male-dominated groupings. These findings highlight complex interactions between textual choices, gender, and success in securing a patent. They also raise questions about whether current proposals (e.g., anonymized examination) will be sufficient to achieve gender equity and efficiency in the patent system.

Price Regulation in the Pharmaceutical Market. In a major empirical study, we studied the Israeli experience with price regulation and parallel imports in the pharmaceutical market. The soaring cost of pharmaceuticals in the United States has become a source of concern for patients, health care providers, and policymakers. Consequently, several attempts have been made in recent years to reduce drug prices by opening up the pharmaceutical market to parallel imports of drugs from Canada and other countries. Similar concerns in Israel led the Israeli legislature to enact reforms in the early 2000s authorizing the parallel importation of medications. The prevailing assumption at the time was that allowing parallel imports would lead to a significant drop in drug prices and a decrease in healthcare costs in Israel. In this article, we presented an empirical study of Israel's experience, examining the effects of these regulatory reforms and the practical impediments to invoking the parallel importation mechanisms they established. Combining quantitative methods, interviews, and a comparative law study, this article produced several important insights concerning the interaction of parallel importation and drug prices. We found that despite reforms intended to incentivize competition in the Israeli pharmaceutical market through parallel importation, competition via parallel imports in this sector remained close to nil. We attributed this to a number of barriers in the Israeli market, including regulatory barriers, contractual barriers, and barriers resulting from asymmetry of information. Nevertheless, our study revealed that even without the expected influx of parallel imports into the market, the maximum price of most prescription drugs in Israel decreased from 2007 to 2020 and that Israeli HMOs typically bought medications for less than their maximum prices. Accordingly, we concluded that opening the Israeli pharmaceutical market to parallel imports may have had an indirect effect on drug prices by improving the bargaining power of these key market players and increasing competitive pressure on manufacturers.

Patents During Pandemics. In two recently published articles, we studied the pressing question of patent protection in times of pandemics. In one article, we considered the challenge of vaccine nationalism during pandemics and offered ways in which intellectual property law could be changed to provide better access to medicines. The COVID-19 pandemic has had devastating effects on our social, economic, and political lives. While the race to develop vaccines yielded results in record time, widespread, affordable access to these vaccines remains a major challenge. Vaccines are in a constant race against new variants of COVID-19, and

unless the world's population is vaccinated quickly, these new variants may lead to many more deaths. Current vaccine supplies fall far short of what is needed, however, and in what has become known as "vaccine nationalism," wealthier countries have poured billions of dollars into advance purchasing agreements that guarantee preferential access for their own populations. The distribution inequities resulting from this nationalistic response undermines the interest of all countries in speedy and universal inoculation. We argued that the problem lies in the pharmaceutical industry's market-driven approach to vaccine development and distribution. We acknowledged that pharmaceutical companies must have some means of recovering their investments in the risky research and development required to create new vaccines, and that patent protections in particular are widely regarded as necessary incentives for pharmaceutical innovation. Nevertheless, we contended that in times of global public health crises, the ordinary principles of exclusivity must give way to the pressing need for immediate, affordable, and widely available access to vaccines. Other manufacturers must be allowed to boost vaccine supplies and lower vaccine prices. Recognizing the need for flexibility when global emergencies arise, and building upon concepts drawn from existing international and domestic compulsory licensing laws, we proposed a centralized, global scheme for providing access to vaccines during pandemics. Under our model, the WHO's declaration of a pandemic would trigger a global procurement and distribution scheme for vaccines. The proposed scheme would be mandatory and would require all countries to operate as one buyer vis-à-vis vaccine developers, vastly increasing the buyers' economic leverage and thus their ability to negotiate pricing and distribution. This procurement scheme would be supported by the power to issue global compulsory licenses of patent, trade secret, regulatory data, and other assets necessary for vaccine production to become effective if and when consensual negotiations with vaccine developers fail. We argued that the success of such an initiative, especially in times of global emergencies, when each country may be tempted to adopt nationalistic protection strategies, depends on mandatory global participation and a firm commitment to the scheme.

In another article, we considered a more fundamental question – the current structure of the patent system and the incentives it provides for drug development to address pandemics, focusing on COVID-19 vaccine development. In this article, we argued that in reality, patent law may be obstructing the very goals it is intended to achieve. Patent law grants exclusive rights to inventors, enabling them to charge supracompetitive prices and delaying the distribution and dissemination of emerging technologies. In the context of COVID-19 vaccines, patent protection means that vaccines are financially out of reach for many. This has produced a paradoxical result: rather than promote technological advancement for the public good, patent protection may impede it. Because universal immunity is necessary in the fight against the pandemic, delays in vaccine distribution can be catastrophic, costing millions of lives and carrying devastating economic consequences. This article proposed a novel, alternative patent regime, designed to overcome this paradox at the heart of patent law. We proposed a mechanism to eliminate the current problem of overprotection of patent rights, while still providing sufficient incentives for inventors to invest in innovative efforts. Under our proposed regime, the developer of a new vaccine would be granted a patent, but the patent would expire once the patentee has recouped its investment and earned a handsome profit. This regime ensures that inventors are rewarded appropriately—but not excessively—for their innovative efforts. The result is a structure that encourages innovation while minimizing the time it takes for life-saving inventions to reach the public domain. We compared the proposed regime with other suggestions for reforming the patent system, while also highlighting the recoupment patent model's advantages over other alternatives.

Other Contributions: **Regulation of book markets in Israel and Europe**. This project critiques the concept of resale price maintenance (RPM), which allows publishers to control the resale price of books for a limited period of time. We explored the normative rationales for RPM and exposed an important blind spot in regulatory policy and judicial treatment.

Patent Fraud. We argue that the current patent system incentivizes patentees to defraud the patent office by offering strong legal protections while failing to impose equally strong sanctions for its abuse. We propose a novel enforcement mechanism grounded in existing legal doctrines such as the remedy of disgorgement, Walker Process antitrust claims, and class action procedures.

Other Projects. In other projects, I examine the effects of land registration on minorities in Israel; the selection schemes adopted by settlements' selection committees; and the relation between IP law and unjust enrichment, among other subjects. I also served as the lead editor of a two-volume book on Elyakim Rubinstein, one of the most fascinating justices of the Supreme Court of Israel.