From WPI's Recent Growth to its Roots in Settler Colonialism

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Abstract

WPI has historically benefitted from settler colonial structures, from the land upon which it was founded to the wealth used to construct its two towers. I investigated WPI's continued use of settler colonial ideologies to justify carrying out social injustices in the City of Worcester. WPI's strategic management policies have begun to transform the city near campus into student housing by displacing current residents. Through this class-based remaking of nearby communities, WPI is accumulating influence over land in ways that disproportionately benefit white capital – a process that asserts the school's right to the city over the of right existing residents or the Nipmuc people from whom the land was stolen. I urge WPI to examine its ties to historically violent ideologies through more than just student projects. The Institute's path to decolonization will begin with understanding, acknowledging, and truthfully retelling its history, from its founding to the present day.

Forward

1.1 Statement of Positionality

In the spirit of self-reflexivity, I acknowledge my own position with respect to this research. I am 23-year-old white, heterosexual, cisgender man who is a citizen of the United States. I began my undergraduate studies first in Mechanical Engineering, then Applied Mathematics at Florida Polytechnic University before transferring to Worcester Polytechnic Institute, where I am a current student working to earn a B.S. in both Mechanical Engineering and Mathematics.

I moved to Fairfax, Virginia at age 10, where my four younger siblings and I had access to high-quality education from elementary school through high school. Though Fairfax is a wealthy county (among the highest income counties in the U.S.), my family's financial situation didn't reflect the affluence around us. As our primary caregiver, my mother relied on working full-time for a church and government assistance to provide necessities for us. She made less than half the median household income of the surrounding area while providing for five children. Despite her income hovering on or near the poverty level, through our community of friends (and perhaps a few small miracles) we always had what we needed. For this, I am grateful.

I acknowledge that my positionality has and continues to shape my view of the world and thus the research I produce. This positionality statement is my attempt to acknowledge these biases.

1.2 Accessibility of Information

Accessibility of Information is critical in this IQP, which is why I've utilized free, open-source data whenever possible. To my knowledge, access to the WPI archives is generally restricted to the public and my use of "mapboxapi" in RStudio exceeded the limits of their free use plan. However, nearly all the information I gathered from these two sources could have been reconstructed, if slowly, from other resources. All my other sources have been open to the public to the extent that I used them.

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1 Introduction

The sunrise is a daily moment of pause in Worcester. Despite the clamor, watching the light cast gentle rays over the city while I listen to children arriving at Elm Park Community School puts my mind at ease. As the as the golden horizon slowly spills over the landscape like honey, the steeple of John Street Baptist Church seems to glow every morning. Past the old church, the two towers of WPI loom; their shadows over Worcester are heavier today than most. The unrelenting pace of development at the school is seeping into the city. WPI has exceeded its ability to house its ever-growing, ever-wealthier student body, and now Worcester must make room. More than a matter of physical space, the weight of institutional expansion reflects a deeply rooted disregard for this local community's history and wellbeing. Where houses along North Ashland and West Street were once haven to the city's largest Black community – centered around the doors of John Street Baptist Church – now live students who can pay ever-higher rent. The school's displacement and replacement of these communities reflects the symptoms of a society built on stolen land – land that is still kept from Indigenous communities who continue to resist settler-colonial practice. For WPI, the path to decolonization begins not only through understanding its history, but understanding how that history is still present in its actions to this day. Over the last 25 years, WPI's foundations in settler-colonialism have continued to guide its strategic decisions. In that time, the school's management of its student body's size, income, racial distribution, and spatial housing distribution has collectively facilitated and encouraged an ongoing process of gentrification in the City of Worcester. The results - cycles of gentrification, neighborhood segregation, and property value decline near campus - continue the school's legacy of prioritizing white claims to land over those of Black, Indigenous, and other People of Color (BIPOC). Though these cycles may decrease the cost of WPI's expansion, it is the residents of Worcester who will pay the difference.

The broad scope of this project necessitates an understanding of the historical and theoretical relationships between the City of Worcester, the People of Color who have – and continue – to live there, and WPI. To draw attention to the structures under which these relationships operate, I review the definitions and measurements of settler colonialism, gentrification, and studentification in Sections 2 and 3. In Section 4, I analyze a host of institutional data through the lens of gentrification and studentification to reveal how the expansion of WPI's student body into the City of Worcester constitutes the school's claim to the city and points to their ongoing reliance on settler colonial structures to generate profit. After showing the school is well-

prepared to gentrify neighboring communities, I discuss a set of statistical models to demonstrate the presence of racial segregation processes in the city near WPI – one of the major components of studentification predicted by the theoretical literature. The statistical models also serve to isolate WPI's effect on Worcester from other higher educational institutions in the city (HEI) and suggest the need for a more nuanced model of gentrification tailored to capture the school's close ties to Worcester's development through history. As WPI's campus and influence expand, so too does the urgency for the institution to critically examine and address its roots in violence. Like Hauff and Dube before me, I emphasize that the Institute should explore and truthfully retell its history – particularly where they have profited from systems of oppression.[1] To that end, I am urging WPI to examine its ongoing utilization of oppressive systems through more than just student projects. However, it is not enough to acknowledge past connections to slavery and Indigenous dispossession; WPI must actively engage in and empower the process of decolonization on its campus; in its faculty and staff; and in its policies.

2 Relevant Background

2.1 A Brief History of People of Color in the City of Worcester

Worcester's history, like the rest of America, is inextricably linked with People of Color. Long before the English settlers arrived, the Nipmuc, or "fresh water people" lived throughout a large part what we now call Massachusetts, Rhode Island, and Connecticut, including Worcester.[2] Though their villages were relatively scattered, mostly clustered around the rivers and streams, they were "careful planners and good stewards of the land upon which they lived."[3] At the time of the pilgrims' landing at Plymouth in 1620, estimates place the total Nipmuc population between five and six thousand people – a low number resulting from incredibly deadly epidemics in 1616 and 1633 with mortality rates as high as 80%.[4] When the English arrived to abandoned cornfields and settlements resulting from the earlier epidemic, they believed God had given them a sign that they,

[1] Building on prior research that connects WPI to historical practices of exploitation and erasure, this IQP follows the work conducted by Dube and Hauff in the '21/'22 and '22/'23 academic years, respectively. Evelyn Dube discussed the relationships a subset of WPI's founders had to slavery. In the '22/'23 academic year, gray Hauff tracked financial information from Ichabod Washburn and Phillip Moen, linking their wealth and manufacturing business they held to dispossession of Indigenous communities in the Western United States. While these two IQPs followed different paths, they both criticized the way WPI portrays its history.

[2] "History," Hassanamisco Indian Museum, accessed April 28, 2024.; Worcester Polytechnic Institute, "Guides: Land & Labor Acknowledgements: Home," accessed April 17, 2024.

[3] "History - Hassanamisco Indian Museum."

[4] "History - Hassanamisco Indian Museum"; Taylor Kirsch, "Indigenous Land Ownership in 17th Century Mission Communities: A Survival Story from Southern New England" (Santa Cruz, CA, University of California, Santa Cruz, 2021), 48.

the English, had rightful sovereignty over the land.[5] Despite the initial, "relatively peaceful" relationship between the Pakachoag Nipmucs and the English Settlers, which involved forced erasure of their culture and Indigenous identity, the Nipmucs were soon violently forced to the reservation at Hassanamesit (modern day Grafton, Massachusetts).[6] The Nipmucs who resisted the English invasion faced execution, enslavement, or, for some, escaping into hiding in the North and West with other Indigenous peoples.[7] Despite the "logic of elimination" held by the English Settlers carried through centuries, the Nipmuc people have continued to live across Worcester County, Massachusetts and continue to do so to this day.[8]

Worcester is also home to a vibrant, Black community that has been well-documented since at least the late 18th century when Quock Walker, a previously enslaved man from Worcester, played an instrumental role in Massachusetts' abolition of slavery.[9] From 1850 through 1860, the population of Black people in Worcester grew in both size and diversity.[10] As manufacturing prospered, many Nipmucs returned in search of work. For their tribal and economic survival, Nipmuc women began to marry and have children with non-Indigenous people, particularly Black people.[11] Some of these Black people had been born in Worcester as the children and grandchildren of enslaved people, and others had migrated from southern states, having escaped their enslavement there.[12] By 1860, around 500 Black people resided in Worcester, around 80% of whom had been born in the North – a significantly larger percentage than the much larger Black community in nearby Boston.[13] Through Worcester's participation in the civil war in North Carolina, many freed Black people chose to return with the soldiers to Worcester.

Many of these Black people who migrated to Worcester hoped for more opportunity in the North. Though racist conceptualizations did not subside from the white population, they found

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[5] "History - Hassanamisco Indian Museum."
[6] Jack Hynick, "Indians in the Archives: A History of Native Americans, Pakachoag Hill and Holy Cross, 1674-1973" 3, no. Article 9 (May 2022): 4.
[7] Hynick, "Indians in the Archives: A History of Native Americans, Pakachoag Hill and Holy Cross, 1674-1973."
[8] Hynick, 5; "Welcome to Nipmuc Nation," accessed April 17, 2024.; Patrick Wolfe, "Settler Colonialism and the Elimination of the Native," *Journal of Genocide Research* 8, no. 4 (December 1, 2006): 387–409.
[9] Janette Thomas Greenwood, *First Fruits of Freedom: The Migration of Former Slaves and Their Search for Equality in Worcester, Massachusetts, 1862-1900* (Chapel Hill, NC: The University of North Carolina Press, 2009), 14.
[10] Daniel Ricciardi, "Census Data of Worcester's People of Color in the 1850s," Worcester and Its People, accessed April 17, 2024.
[11] "History - Hassanamisco Indian Museum."
[12] Ricciardi, "Census Data of Worcester's People of Color in the 1850s."
[13] Greenwood, *First Fruits of Freedom: The Migration of Former Slaves and Their Search for Equality in Worcester, Massachusetts, 1862-1900*, 50–51.

refuge in the existing communities of Black Worcesterites. During and after the civil war, Northern whites asserted it was their duty to elevate freed Black people, but they failed to recognize them as fully human.[14] Moreover, these white people saw themselves as "indispensable agents of 'uplift,' denying…" that Black people could adequately uplift themselves.[15] Though they claimed indifference to race, business owners were often unwilling to hire Black workers – even in industry positions. For example, business owners answering local surveys in 1929 said, "[Blacks] as a class did not seem to be machinists."[16] They felt Black workers were "not good workmen, too indolent" saying they would find jobs "if they had any energy."[17] While migrant families struggled to find comfort in Worcester, they found refuge with each other and the existing Black communities. By the late 19th century, it was common for People of Color in Worcester to cluster into small enclaves of "three or four structures", each of which housed "anywhere from one to five households."[18] These enclaves, and Worcester's Black community as a whole, were "tightly organized… and [had] well-established interracial networks of aid and support," even compared other New England cities like Boston.[19] Among these enclaves the one located on and around John Street near Mt. Olive Baptist Church (now John Street Baptist) was the largest as of 1888 and had been among the largest since the early 1860's.[20]

Less than a ten-minute walk from John Street Baptist Church, WPI has sat in the center of Worcester since the school's founding (see Figure 1). The school currently holds at least 55 distinct properties as of January 1st 2023, though these records omit many established WPI student housing locations like South Village, Cedar Street, and Fruit Street which the institution may rent from other owners (see Figure 1 Right). [21] While the Institute currently owns much land, its official address is at 100 Institute Road, which contains the original plots given to the Institute by Stephen Salisbury. The school is not just spatially centered within the city, it is also centered on the historical divide between the working-class to the south, the factories in the east, and the homes of management and white-

[14] Greenwood, 62.
[15] Greenwood, 62.
[16] Janette Thomas Greenwood, "Janette Thomas Greenwood: Acknowledging Racism in Worcester's Industrial Past," The Worcester Telegram & Gazette, accessed April 28, 2024.
[17] Greenwood.
[18] Kathryn Mahoney and Jacqui McEttrick, "Homes and Housing Patterns of People of Color in Worcester in 1888," Worcester and Its People, accessed April 17, 2024.
[19] Greenwood, *First Fruits of Freedom: The Migration of Former Slaves and Their Search for Equality in Worcester, Massachusetts, 1862-1900*, 52.
[20] Greenwood, 52; "An Older African American Neighborhood: John, Lily, North Ashland, & Bowdoin Streets" (Worcester, MA: Holy Cross University), accessed April 17, 2024.
[21] "Property Records | City of Worcester, MA," City of Worcester, MA, 2024.

collar workers to the North and West. To the South of the Institute, many of the "three-decker" Victorian-style houses originally used to house the working class remain in use – including those used by the Black enclave historically centered around John Street Baptist Church. Along West Street, many of these homes currently house WPI students. Near WPI's east-most property one can find the old Washburn and Moen factory that produced the wealth the school was founded upon.

Figure 1) Depiction of WPI-Owned and WPI-Controlled Land in Worcester (from left to right); Left Image created by Author; Right Image Adapted from "Interactive Campus Map,", Concept3d, Worcester Polytechnic Institute, Accessed 28 April 2024.

WPI's location is far from its only tie to Worcester's history. The city's deep history in manufacturing and the effects industrialization had on Worcester are closely tied to WPI's founders. The Blackstone canal connected Worcester, MA with Providence, RI in 1828, and the first railroads connecting Boston to Worcester opened in 1835.[22] These improvements to Worcester's transportation allowed people like Stephen Salisbury II and Ichabod Washburn, both later founders of WPI, to be among the first entrepreneurs to expand the city into the booming manufacturing center it would become.[23] The factories these leaders built, like Washburn and Moen's wire manufacturing center, created new working classes. These new class divisions caused the slow division of Worcester's East and West sides as workers constructed thousands of "three-deckers" on the East side to house the new working class, which was structured around both class and ethnic divisions.[24] The choices of WPI's founders shaped the landscape of Worcester – it is no mistake that working-class people lived separately from white-collar workers. The continued reshaping of Worcester has had such an intense impact that it is still visible in U.S. Census data through the

[22] "Industrialization," Worcester Historical Museum, accessed April 28, 2024.
[23] "Industrialization."
[24] "Industrialization."

relationships between location and racial groups today. Worcester has since begun the transition from a manufacturing-based to an education-based economy where education and healthcare are the largest employers – forming the basis of the city's economy. [25] As a result, WPI's economic position reflects its founders' history. They began the transition into Worcester's Industrialization, and now, for better or worse, WPI is similarly positioned to shape Worcester in the near future as a leader in the upcoming education industry. While it has, and will continue to be shaped by transient industries, do not forget that Worcester is built on the same land that was stolen from the Nipmucs in the 17th century.

The history of Worcester is a history of dispossession and resistance. Through its whole history, Worcester has been built on Indigenous land, and, as we will discuss, WPI has continued the process of burying that history ever-deeper below new construction and meanings. Though their culture has been suppressed, the idea that Nipmucs in Worcester have been "eliminated" or having "disappeared" is, itself, a settler-colonial fantasy – a desire that has never been fulfilled.[26] The Nipmuc people continue to exist, as do the Black and Brown communities across the city. While we may discuss the violence that has been committed against these people and their cultures, the ideologies that motivated their displacement and dispossession are not events – they are structures that people continue to actively resist. As I will soon discuss, settler-colonialism relies on selective forms of (in)visibility to deny these forms of resistance, instead forming calls to settler innocence to reinforce the idea that settler-control is 'natural.'[27] To reject these ideologies, and begin the process of decolonization, systems that have used, relied on, and benefitted from these violent ideologies, like WPI, must work to tell an accurate account of history – work begun by my predecessors gray Hauff and Evelyn Dube, who discussed some of WPI's roots in Indigenous dispossession and enslavement. Now, I will show how WPI continues both the English settler's fantasy of Indigenous erasure and racist policies of displacement in hopes that the school will break down its current ties to the violent ideologies that it continues to spread in the City of Worcester.

[25] "Doing Business in Worcester," Worcester Regional Chamber of Commerce, accessed April 28, 2024.
[26] Lorenzo Veracini, *Settler Colonialism: A Theoretical Overview*, Hardback Edition (New York NY USA: Palgrave Macmillan, 2010), 8.
[27] Margaret Ellis-Young, "Gentrification as (Settler) Colonialism? Moving beyond Metaphorical Linkages," *Geography Compass* 16, no. 1 (2022): 3.; Eve Tuck and K Wayne Yang, "Decolonization Is Not a Metaphor," *Decolonization: Indigeneity, Education & Society* 1, no. 2 (2012): 1–40.

2.2 Settler Colonialism, Gentrification, and Studentification

Before one can dismantle settler-colonialism, one must understand their enemy. Among the structures that have shaped the world in which we live, few among them have been as potent or harmful as settler colonialism. Ideologies are shared epistemological structures that serve a very particular purpose: as an interface between collective group interests and individual social practices.[28] More specifically, settler colonialism is an ideology that interfaces between individual actors within an exogenous group and the intent of that group to continuously inhabit and assert sovereignty over the colonized land, and by extension, the people therein. Over time, the collective actions of these settlers have had a hand in every aspect of America – from the government, the structure of education, and religious beliefs, to the generational and institutional wealth created by individuals like Ichabod Washburn and Philip Moen.[29] These specific actions and observable results cannot be fully understood as just events because they are not independent; they are part of a much broader structure that disrupts Indigenous people's relationship to their land.[30] Because their land is so fundamentally linked to their identity *as Indigenous*, the disruption of native people's relationships to land "represents a profound epistemic …[and]… ontological violence" that is reasserted by settler groups every moment that the occupation continues.[31] The indigeneity of a native presence stands in the way of the settler colonists' desired sovereignty in both personal right and history. Notice that the person need not disappear – only the claim to the land formed by their Indigenous identity. The exogenous group's desire to inhabit and dominate requires the erasure and elimination of Indigenous people *as Indigenous*.[32] Hence, physical harm need not be the exclusive form of violence that settler-colonists commit to erase the Indigeneity of the people whose right to the land supersedes their own.

Indigenous peoples have persisted in the face of settler colonialism and have never stopped laying claim to their land. So, to maintain its power in spite of ongoing Indigenous resistance, an

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[28] Sonja K. Foss, *Rhetorical Criticism: Exploration and Practice*, 5th ed. (Long Grove, Illinois: Waveland Press, Inc., 2018), 237, 239.

[29] Veracini, *Settler Colonialism: A Theoretical Overview*, 22; Corey Snelgrove, Rita Dhamoon, and Jeff Corntassel, "Unsettling Settler Colonialism: The Discourse and Politics of Settlers, and Solidarity with Indigenous Nations," *Decolonization: Indigeneity, Education & Society* 3, no. 2 (September 29, 2014).; Tuck and Yang, "Decolonization Is Not a Metaphor," 1; Gray Hauff, "Examining WPI's Connection to Indigenous Dispossession in the United States" (Worcester, MA: Worcester Polytechnic Institute, March 31, 2023), 3.

[30] Wolfe, "Settler Colonialism and the Elimination of the Native"; Tuck and Yang, "Decolonization Is Not a Metaphor"; Veracini, *Settler Colonialism: A Theoretical Overview*.

[31] Tuck and Yang, "Decolonization Is Not a Metaphor," 5.

[32] J. Kēhaulani Kauanui, "'A Structure, Not an Event': Settler Colonialism and Enduring Indigeneity," *Lateral* 5, no. 1 (2016).; Veracini, *Settler Colonialism: A Theoretical Overview*, 9.

exogenous group must continuously maintain the boundary that separates "us" from "them." In settler culture, the presence of native people is (selectively) acknowledged in history and their present voices are left unacknowledged.[33] This selective (in)visibility of Indigenous history and voices reinforces the broader fantasy of native elimination (and therefore settler-sovereignty). One of the primary claims upheld by settler colonialism, and one with which this paper is concerned, is the reinforcement that white claims to land are somehow natural – putting the land to better use than other groups could.[34] Settlers support this prioritization by choosing whose voice is heard – declaring their own innocence while ignoring claims from other groups.[35] These selective views of which parts of whose identities are or are not visible point to direct methods of control that must be exerted by settler-colonial ideologies to continue indigenous dispossession. It is through this continued prioritization of white claims to land in Worcester over the yet unending calls of the Nipmuc (and others) that bring our discussion to gentrification: one of this project's major interfaces between settler colonialism, WPI, and numerical data.

Gentrification has been described as a process through which a particular area is developed, often at the expense of the original residents. [36] While this definition is simple to conceptualize, it fails to capture both the violent nature of the process it describes and its ties to settler-colonialism. Though frequently masked as "urban revitalization" or "economic development," gentrification processes are fundamentally inequitable, class-based transformations of space driven by the pursuit of increased return on investment. While not its own form of colonialism, gentrification holds deep roots in racist settler colonialist ideologies that continue the erasure of Indigeneity, prioritize whiteness, and further the accumulation of white capital.[37]

Introduced in the 1980's, a supply-based model called "rent gap" theory advanced the understanding of spatial relationships between the movement of capital and gentrification within capitalist urban spaces like Worcester.[38] At the heart of the theory are economic agents – including landlords, developers, and even HEIs like WPI – and their desire to maximize their return on

[33] Natalie J.K. Baloy, "Spectacles and Spectres: Settler Colonial Spaces in Vancouver," *Settler Colonial Studies* 6, no. 3 (July 2, 2016): 209–34.
[34] Lauren Ilano, "Urban Universities on Contested Terrain: Racial Academic Capitalism, Gentrification, and the Politics of Expansion" (UCLA, 2020), 61.
[35] Ellis-Young, "Gentrification as (Settler) Colonialism?"; Tuck and Yang, "Decolonization Is Not a Metaphor."
[36] Derek Gregory et al., *The Dictionary of Human Geography*, 5th ed. (Blackwell Publishing Ltd, 2009).
[37] Ellis-Young, "Gentrification as (Settler) Colonialism?," 4.
[38] Neil Smith, "Gentrification and the Rent Gap," *Annals of the Association of American Geographers* 77, no. 3 (September 1, 1987): 462.

investment (ROI) within a capitalist system. The "rent gap" itself is the difference between the current value of the land and the maximum potential value in the eyes of those with the power to alter it.[39] Over time, rent gap theory posits that capital will flow from places with a low rent gap (low ROI) to places with a high rent gap (higher ROI) – resulting in a gentrification process.[40]

Disparities between varied socioeconomic classes have historically been widened by inequitable distribution of the benefits generated by development projects, which has been empirically demonstrated in Worcester. If the benefits of revitalization projects insufficiently compensate a given resident for the associated cost increases, then they must either relocate – an involuntary displacement only possible if the cost of relocation is sufficiently low – or live with a decreased standard of living.[41] Furthermore, despite the benefits promised to communities from "economic development," they are often not distributed evenly between existing residents. In her 2022 analysis of gentrification in Worcester between 1970 and 2019, Naya Burshan found evidence that gentrification in Worcester did improve areas in which it occurred, having lower poverty rates, lower vacancy, and higher income.[42] However, those benefits were not distributed equally among racial groups. She found evidence that white people displaced Black and Hispanic residents, and that when displaced, groups experienced lower incomes, employment, and educational attainment.[43] So those who hold lower socioeconomic status (SES), like Black and Hispanic residents, receive fewer, if any benefits, when compared to their white counterparts of otherwise similar status – demonstrating that gentrification is biased toward white possession and wealth accumulation in Worcester.

Gentrification is not just broadly racist; it is directly tied the erasure of Indigenous identities. For example, in some way gentrification seems to construct a "metaphorical indigenization" of current residents in a particular area who are displaced by gentrifiers.[44] This metaphorical connection has been repeated so often that some scholars have gone so far as to theorize gentrification

[39] Smith, 464.
[40] Ilano, "Urban Universities on Contested Terrain," 4; Neil Smith, "Toward a Theory of Gentrification A Back to the City Movement by Capital, Not People," *Journal of the American Planning Association* 45, no. 4 (October 1, 1979): 538–48.
[41] Jacob L Vigdor, "Does Gentrification Harm the Poor?," *Brookings-Wharton Papers on Urban Affairs* 2002, no. 1 (2002): 133–82.
[42] Naya Burshan, "A Welfare Analysis of Gentrification in Worcester, Massachusetts" (Amherst College, April 20, 2022), 50.
[43] Burshan, 52.
[44] Ellis-Young, "Gentrification as (Settler) Colonialism?," 4.

represents some form of "new urban colonialism."[45] Yet, to equate settler colonialism with social injustices like gentrification ultimately obscures direct relationships between the two. [46] The simple, foundational error in this metaphor that makes it so dangerous is that the 'old' colonialism has not ended. The same people being displaced through gentrification still have greater access to Indigenous lands than the Indigenous peoples themselves.[47] The logic of equating the two structures relies on centering non-Indigenous people as having the same rights and history to the land as those who are truly native to it – an example of a call to innocence that fails to acknowledge the dispossession of Indigenous people.[48] Gentrification has direct ties to settler-colonialism – it need not rely exclusively on metaphor. Indigenous writer and educator, Wakíŋyaŋ Waánataŋ (Matt Remle – Lakota) argues that "gentrification is a symptom of settler-colonialism, but not colonialism itself."[49] The structures that enabled the cultural genocide of native people are easily translated into displacement of local residents, but the reverse is not necessarily true. The displacement of local residents does not necessarily amount to cultural genocide. Recall that the process of gentrification itself is predicated on the idea that some land can be put to better use (e.g. higher profit) than other land and that these 'better uses' disproportionately benefit whiteness and white accumulation. In that way, gentrification fundamentally relies on the rationale that there is no existing Indigenous sovereign presence – a claim that continues to "displace Indigenous bodies and spatial claims."[50]

The continued remaking of land continues through the process of studentification. Building on theories of gentrification, studentification describes economic, social, cultural, and physical changes in urban centers driven by the (re)commodification of student lifestyles made profitable by the influx of students seeking higher education.[51] As a theory, studentification allows researchers to critically assess the uneven development and resistance resulting from University policies, and use that analysis to establish that the University assumes its "right to the city" – directly tying the process to settler colonial practices of continuing to claim Indigenous land. [52] Studentification is particularly

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[45] Wakíŋyaŋ Waánataŋ, "Jul 29, 2017 - Gentrification Is NOT the New Colonialism," Last Real Indians, July 29, 2017.; Rowland Atkinson and Gary Bridge, eds., *Gentrification in a Global Context: The New Urban Colonialism* (London: Routledge, 2004).
[46] Tuck and Yang, "Decolonization Is Not a Metaphor," 17.
[47] Waánataŋ, "Jul 29, 2017 - Gentrification Is NOT the New Colonialism."
[48] Tuck and Yang, "Decolonization Is Not a Metaphor."
[49] Waánataŋ, "Jul 29, 2017 - Gentrification Is NOT the New Colonialism."
[50] Ellis-Young, "Gentrification as (Settler) Colonialism?," 5.
[51] Darren P. Smith, "'Studentification Ication': The Gentrification Factory?," in *Gentrification in a Global Context: The New Urban Colonialism*, ed. Rowland Atkinson and Gary Bridge (London: Routledge, 2004), 74.
[52] Sayoni Bose, "Universities and the Redevelopment Politics of the Neoliberal City," *Urban Studies* 52, no. 14 (November 1, 2015): 2630.

prominent in cities moving from a manufacturing-based to an education-based economy like Worcester.[**cite**] One its basic prerequisites is a growing student enrollment that exceeds an urban university's ability to provide housing, subsequently forcing local communities to absorb the growing demand to shelter off-campus students.[53] The effects of studentification tend to occur close to the institution, and in 2019, Moos' et. al. established a measure of student proximity that they were able to correlate with gentrification. Moos' proximity provides a quantitative foundation through which this project empirically explores the effects of WPI's expansion on the surrounding communities (for more information on Moos' Proximity see Appendix A).[54] The well-established effects of studentification include the racial segregation of neighborhoods, the degradation of property value, and the city's cultural adaptation to suit the university's student culture rather than that of the current residents. Though this research heavily focuses on establishing the existence of studentification and neighborhood segregation as a result of WPI's expansion, property value decline and cultural molding play a significant role in the expected outcomes of the process.

To understand how neighborhood segregation occurs because of higher concentrations of students in an area, one must understand the motives of local stakeholders. As the need for off-campus student housing grows, local property stakeholders recognize the opportunity to profit off the excess students' transient presence in the city by converting homes into multiple-occupation (MO) housing – a conversion process that can inflate rent and property prices.[55] As noted above, much of the housing south of WPI is comprised of Victorian-style "three-decker" homes which were purpose-built in the 19th century as MO housing for the working class. Though they may require renovation – by nature of their age – pre-existing multiple family homes lower the barrier to landlords' conversion to student housing. The proximity of these "three-deckers" immediately south of WPI's campus increases the risk of studentification because students are able to effectively 'subsidize' the cost of rent compared to current residents (particularly families) by living in groups with other students and splitting the rent among them. I'll review this effective 'subsidization' in greater detail within the context of Worcester in Section 4.2. As student-shared MO housing increases, creating "student only enclaves" within the city, working-class families are often displaced

[53] Daniel T. Gross, "Studentification, Racial Inequity, and Rust Belt Revitalization: A 'Longitudinal' Exploration of the Demographic Impacts of Studentification in the City of Binghamton and the Village of Johnson City, NY (2000 – 2023)" (M.A., United States -- New York, State University of New York at Binghamton, 2023), 24.
[54] Markus Moos et al., "The Knowledge Economy City: Gentrification, Studentification and Youthification, and Their Connections to Universities," *Urban Studies* 56, no. 6 (May 1, 2019): 1075–92; Darren P. Smith et al., "The Segregation of Educated Youth and Dynamic Geographies of Studentification," *Area* 46, no. 1 (March 1, 2014): 92–100.
[55] Gross, "Studentification, Racial Inequity, and Rust Belt Revitalization," 24.

being "outpriced, or bought out, from their currently occupied homes."[56] Students who have better access to high levels of wealth benefit in this exchange. Studentification is also a distinctly racialized process. In 2023, researchers explicitly stated that the whiteness of studentification is not just a reflection of racial barriers to education (though they certainly remain a large component); they suggest that these processes are also guided by exclusionary practices within the real-estate industry, local planning, and the educational institutions themselves.[57] Note that racial biases that affect students are likely consistent with racial biases affecting non-students. So, racial biases in an institution like a real-estate agency may translate into racially inequitable housing practice among students. Likewise, establishing the existence of racial biases within an HEI does not limit that bias to the institution's student body; it can also influence interactions with the community. So, if an HEI is racially biased toward one student group, that may compound the already racialized process of studentification. Students who are racially privileged (through whiteness, model minority myths, etc.) are less likely to face racial discrimination, including throughout the process of studentification. Therefore, a student body who is, on average, more racially privileged than the surrounding community will, on average, hold more power to transform that community. Overall, the racial biases in studentification combine with other forms of privilege and practices of displacement to drive neighborhood segregation.[58] In combination, these practices align with the same ideologies of displacement found in gentrification while continuing to make claim to Indigenous lands.

3 Methodology

To explore the relationship between WPI's expansion and settler-colonial ideologies, I used a 'mixed methods' approach to attempt to bridge the gap between the school's publicly stated objectives and the real-world effects felt in the Worcester community using primarily open-source data. Initially, I drew upon qualitative data from WPI's self-studies, qualitative feedback from externally conducted evaluations, and numerical data from the school's self-reported data in their admissions "Fact Books" and the Integrated Postsecondary Education Data System available from the National Center for Education Statistics (NCES). My subsequent analyses focused on racial demographic trends in Worcester based on quantitative data from the U.S. Decennial Census and the American Community Survey (ACS).

[56] Gross, 24.
[57] Nick Revington et al., "Universities and Urban Social Structure: Gentrification, Studentification, and Youthification in Five United States Legacy Cities," *Urban Geography* 44, no. 1 (January 2, 2023): 99.
[58] Gross, "Studentification, Racial Inequity, and Rust Belt Revitalization," 10.

To begin, I searched WPI's archival collections for evidence of policy decisions that could explain the school's approach to diversity and lack of student housing – both of which were emphasized to me by other students prior to beginning the IQP. Having shown the relationship between literature and the school's student body management through the school's strategic plans and feedback from the school's accreditation body, I used the quantitative methods to confirm one of the effects on the community predicted by prior research. In my final model, I introduced information from each HEI in Worcester information to isolate the effect of WPI.

3.1 Sources

In 1999, 2015, and 2021, WPI established a detailed strategic plan to outline its institutional goals based on comparative analyses between itself and other schools of interest; projective analyses of the school's success; and feedback from students, faculty, staff, and administrators. While portions of each document are publicly available, much of the analyses remain confidential.[59] The publicly available component also represents a significant avenue through which the administration can make declarations of continued success at the school, not unlike the U.S. President's annual State of the Union speech. As such, there is a strong component of careful rhetorical framing present in each of the strategic plans. I was able to view the full plan for 1999 in the WPI Archives. However, because I accessed the 2015 and 2021 plans from the school website, I did not have access to either in their entirety. Despite lacking the analysis sections of the two most recent plans, each of these documents provides significant insight into the administrative perspective of the school's trajectory which can be useful in identifying priorities and shifts in policy over time.

In addition to the school's self-produced strategic plans, I reviewed the self-studies and accreditation reports WPI sent to, and received from, its accrediting body: the New England Commission of Higher Education (NECHE; formerly the Commission on Institutions of Higher Education of the New England Association of Schools and Colleges), as well as WPI. As part of its decennial reaccreditation process, WPI has submitted self-study reports to NECHE, which in turn sent evaluation teams to WPI in 2001, 2012, and 2021.[60] These teams are comprised of leaders from the faculty and administration from other schools who are primarily in the in the New England

[59] "New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige; FY2000 to FY2010" (Worcester, MA: Worcester Polytechnic Institute, May 1999), UA03: Provost and Vice President for Academic Affairs records, UA03.02.02, Box 4, WPI University Archives.
[60] Dennis Berkey et al., "Report to the Faculty, Administration, Trustees, and Students of Worcester Polytechnic Institute, Worcester, Massachusetts" (Worcester, MA: New England Association of Schools and Colleges, 2001).

region. After reviewing WPI's self-study and conducting their decennial visit, the evaluation teams submit reports in which they highlight the noted strengths of the institution as well as pressing weaknesses that the school shows. While none of these reports are comprehensive of the school's every decision, each accreditation report indicates how experts and leaders of higher institutions viewed WPI's relative successes and the key areas to improve upon for the continued success (and reaccreditation) of the school.

Early in the process of completing this IQP, I began collecting longitudinal data concerning WPI's student body from two major sources: WPI's annually published "Student Fact Books" and the Integrated Postsecondary Education Data System (IPEDS), administered by the National Center for Education Statistics (NCES). The Student Fact Books (which were originally confidential and later transitioned to an open set of online dashboards) provided an annual compilation of institutional data from as far as the late '70s to 2023 that included detailed demographic information about current students, applicants, incoming classes, and program offerings. IPEDS provides public access to a broad range of self-reported data from WPI and other colleges in the area. IPEDS offers an incredible suite of surveys that they collect from all institutions that receive federal financial aid.[61] Over the course of this project, I collected information about enrollment (by level of education, gender, and race), cost of room & board, cost of tuition and fees, and financial aid disbursements from IPEDS. Both IPEDS and the WPI fact books are open source, though the latter is increasingly difficult to source as the school's website support for old pages and files diminishes. Together, these sources provide an excellent numerical dataset and provide a clear view of trends in WPI's student body across decades, forming a basis for empirical discussion of WPI's demographic management and strategic institutional growth.

The final two components of the data for this project are the U.S. Decennial Census and the American Community Survey (ACS), both of which are administered by the U.S. Census Bureau. The decennial census is collected with the goal of creating a comprehensive enumeration of the U.S. population, and provides publicly available, detailed demographic, social, economic, and housing information down to the scale of a census block.[62] The census is generally conducted by collecting surveys sent to each address across the country.[63] While the census is conducted every ten years, the

[61] National Center for Education Statistics, "IPEDS," accessed April 22, 2024.
[62] US Census Bureau, "Decennial Census of Population and Housing by Decades," Census.gov, accessed January 23, 2024.
[63] US Census Bureau.

ACS is an ongoing survey that annually samples a subset of the population to provide census-like data estimates at a higher frequency.[64] I accessed data from the three most recent censuses and from the ACS from 2009 to 2022 through a combination of open source libraries in a free programming software called RStudio. Unless otherwise specified, I'm considering the boundaries of the City of Worcester as the census-designated county subdivision in Worcester County, Massachusetts. The robust, standardized datasets provided by both the Decennial Census and the ACS were critical sources of this project because they allowed me to perform detailed analyses on demographic changes and WPI's impact in Worcester.

3.2 Analytical Methods

The first analysis to follow this methodology section will be a pair of descriptive and comparative analyses to establish baseline trends at WPI: who are the WPI students and how has the student body evolved in the last 25 years? Reviewing WPI's strategic plans, student demographics, and public-facing announcements vs. the resulting numerical trends at the school will provide opportunities to highlight some of the key changes that have occurred since 2000. It will also provide an opportunity and evaluate how WPI's declared goals align with actual outcomes on campus. This approach represents an initial, yet seemingly effective evaluation of WPI's operating principles and apparent priorities.

To analyze trends in the spatial distribution of racial groups in Worcester over time, I used two main statistical measurements: Moran's I and the Mutual Information Index (M). Moran's I measures "spatial auto-correlation" within data – the idea that spatial relationships between measurements in different locations can influence the measurements themselves.[65] For example, suppose members of a certain group tend to live near one another, then if you observe a high population in a given census block, you may expect to see relatively high populations in neighboring blocks. In the case of this research, that is the question that Moran's I answers: the question of whether members of a certain group tend to live closer (yielding a positive number) or further from each other (yielding a negative number). The mutual information index provides a numerical description of the level to which different groups tend to separate themselves (For more information on the Mutual Information Index, see Appendix A)

[64] US Census Bureau, "About the American Community Survey," Census.gov, accessed April 22, 2024.
[65] "How Can I Calculate Moran's I in R? | R FAQ," accessed April 22, 2024; "How Spatial Autocorrelation (Global Moran's I) Works—ArcGIS Pro | Documentation," accessed April 22, 2024.

To implement each of the following analyses, I used R and RStudio because of their well-established presence in statistical literature and the availability of their free, comprehensive libraries and APIs for geospatial data analysis. To begin, for 2000, 2010, and 2020, I established that the distribution of each racial group was spatially non-uniform and the degree to which each racial group is clustered across the city with Moran's I. The next step was to apply M to all racial groups, yielding both a city-wide and block-wise measure of segregation. The final step I completed was twofold in nature. First, I examined the change in diversity as a function of distance from WPI. Then, I performed a spatially-autocorrelated linear regression over measurements of the census blocks' proximity to all eight HEIs in the City of Worcester, isolating the effect proximity to WPI has on segregation compared to Assumption University, Clark University, College of the Holy Cross, MCPHS University, Quinsigamond Community College, University of Massachusetts Chan Medical School (UMass Chan Medical School), and Worcester State University.[66] These final steps provide a direct statistical link between WPI and the movement of racial groups with respect to Institutional growth.

3.3 Data Modifications, Statistical Standards, and Reproducibility

One challenge that I came across was the variability in labels of racial categories to which WPI, IPEDS, the Census, and ACS data adhere over time. If labels are inconsistent over time, I adjusted where possible and made note of it. For example, in 2001 WPI placed students who identified themselves as "Asian" in the same category as students who marked "Native Hawaiian or Pacific Islander."[67] So, to compare the 2001 student distribution to the 2023 student distribution at WPI, I combined Asian and Pacific Islander students in the 2023 distribution and made note of it on the plot.

Another challenge was the availability and granularity of data. In order to obtain statistically significant results, I was forced to use exclusively data only available from the decennial census. These datasets have the highest granularity by far, going down to the block level. Utilizing ACS data may allow for better time-resolution, but accounting for the large spatial zones and the margin of error it provides for each variable is not well-explored in existing literature.[68] The appropriate

[66] City of Worcester, MA, "Colleges & Universities," accessed April 24, 2024.
[67] Nikki Andrews, "2001 Student Fact Book," Periodic, Student Fact Books (Worcester, MA: Worcester Polytechnic Institute, October 8, 2001).
[68] Jeffrey Napierala and Nancy Denton, "Measuring Residential Segregation With the ACS: How the Margin of Error Affects the Dissimilarity Index," *Demography* 54, no. 1 (February 2017): 285–309.

utilization of ACS data in segregation analyses represents a direction for future research.[69] An additional concern was comparing school enrollment to the 2000 census because I was unable to obtain information older than 2001 from the IPEDS database. However, because the change in student population was relatively small (particularly at WPI) in 2001, I chose to continue – comparing the 2001 student enrollment at Worcester Universities to the 2000 Census data. I was also unable to obtain data describing the student population at MCPHS' Worcester Campus. Because MCPHS has three campuses (only one of which is in Worcester), I used one third the total population of MCPHS to evaluate the statistical significance of the university.

To ensure the validity and reproducibility of my results, I strictly adhered to several statistical and methodological standards. By using established statistical tools and techniques, I hope to minimize my own bias. Unless otherwise specified for a particular model or measurement, I considered a 95% confidence interval ($p \leq 0.05$). If taking a point estimate for some measurement over a set of data, like a mean, I used bias-corrected bootstrapping (n=500) or bias-corrected Monte-Carlo bootstrapping (n=500) to determine confidence levels if required.

Before considering any model sufficient, unless otherwise stated, I required that each coefficient in the model be statistically significant; that the residual errors be normally distributed according to a Shapiro-Wilk test, a Quantile-Quantile Plots (Q-Q Plots), and a Residual Histogram; and that the residual errors show no statistically significant autocorrelation in space, time, or the parameter space - whichever applies for the specific model. Based on previous coursework, I ran each regression repeatedly, adjusting the predictor set each time, until each predictor was significant. I used different measures of normality and autocorrelation based on whether the model was spatial, time-based, or neither. For spatial and temporal models, I used ordinary least squares regression and adjusted some specific characteristics according to model type. For non-spatial, non-temporal models like racial representation in student body based on median income by race, I confirmed the independence of the predictors before running the model.

My standards for time and spatially based models, my standards were a little different. For time-based models, I had an additional goal of stationarity with respect to time. I did not build any full ARIMA models, though they could prove useful to future research in the future. I created a residual time plot to evaluate global trends in the data. I plotted and summarized both the

[69] Napierala and Denton.

autocorrelation functions (ACF) and partial autocorrelation functions (PACF) of the data to evaluate its stationarity. If the residuals were stationary, but non-normally distributed, I applied a transformation on the response variable to make the distribution of the residuals approximately normal.[70] If the residuals were normal but showed autocorrelation, I re-estimated the standard error for each coefficient with a Newey-West routine to evaluate its statistical significance more accurately.[71] For each time series model, I created a panel of plots describing the residual-time plot, ACF, PACF, Q-Q Plot, and Histogram. Lastly, for spatial regression models, I evaluated ordinary least squares regression and spatial lag models using a Delaunay Triangulation to determine neighboring census blocks. The residuals from spatial models are more difficult to analyze through visual plots, so I relied more on summary statistics provided by R than with the other models I discuss. I still created a Q-Q Plot and a residual histogram as before. To evaluate the level to which the residuals remained spatially correlated, I evaluated Moran's I statistic instead of creating a specific plot. I also used Moran's I to choose between the OLS vs. spatial lag model. I did not consider any combined spatial error and lag models, and this represents a direction of potential future contribution.

4 Analysis and Results

4.1 Privilege and Diversity within WPI's Student Body

In this section, I review descriptive records of WPI, including accreditation reports, institutional strategic plans, student racial demographics, and financial aid characteristics from 1999 to 2022. With this evidence, I demonstrate that, in recent years, WPI has targeted enrolling students from increasingly affluent backgrounds to ease its own financial burdens, producing a highly concentrated source of racially biased wealth in the City of Worcester that is well-positioned to gentrify the city. Additionally, the school continues to translate systemic racial inequalities in access to educational attainment into representation on its campus, despite the increased enrollment of BIPOC students. Their approach to demographic management highlights the school's prioritization of wealth over diversity, undermining its carefully repeated commitment to the latter within its student body. By itself, prioritization of income does not imply that WPI discriminates based on race beyond that race's relationship to wealth. However, NECHE in 2001 and hundreds of WPI Alumni in 2020 have described students' experiences of racism on campus. Though WPI responded

[70] National Institute of Standards and Technology, "4.4.5.3. Accounting for Errors with a Non-Normal Distribution," accessed April 23, 2024.
[71] Real Statistics Using Excel, "Newey-West Standard Errors," accessed April 23, 2024.

to the letter from its Alumni, I found no evidence of later updates or progress. Under its current institutional trajectory, the risk of WPI driving studentification is inflated by the institute's prioritization of wealth over representation and institute-wide racist practices.

Among the most prominent concerns highlighted by NECHE through its evaluations of WPI in the last 24 years has been the Institute's lack of diversity. In 2001, the evaluation team repeatedly addressed the issue within their official report because they felt "concerned that there is an inadequate understanding [at WPI] of what will be required to bring about change, or an insufficient will to bring about change, or both."[72] Additionally, when the evaluation team spoke to students of color on campus they reported, "these students spoke of feelings of racism in and out of the classroom."[73] The commission pushed that in the 5 years before the school's response, that WPI should emphasize, "achieving its own goals for diversifying its faculty and student body."[74] Recall that the evaluation team was primarily comprised of leaders (administrators and professors) from nearby universities and colleges, most of which receive criticism for their continued lack of diversity to this day.[75] The arguable lack of diversification of the evaluators' own schools since 2001 lends significant gravity to their concerns about WPI's obstinacy and potentially willful ignorance regarding the diversification of its student body. Though NECHE acknowledged some increase in the school's enrollment of BIPOC students in response to WPI's 10 year study in 2012 and 5 year self-studies in both 2006 and 2016, subsequent evaluation teams continued to affirm WPI's continued lack of diversity – in spite of its own goals and commitments – as an area in which improvement was necessary.[76] Diversity was no longer in NECHE's report as of their 2021 visit, though WPI itself maintains that increased diversity is highly valued among its institutional goals.[77]

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[72] Berkey et al., "Report to the Faculty, Administration, Trustees, and Students of Worcester Polytechnic Institute, Worcester, Massachusetts," 6.
[73] Berkey et al., 15.
[74] Ronald L. Zarrella, "Mr. Ronald L. Zarrella to Dr. Edward Alton Parrish on Behalf of the New England Association of Schools & Colleges, Inc.," May 6, 2002, 1; "New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige; FY2000 to FY2010," 9,33.
[75] Econsult Solutions, Inc., "New England Colleges and Universities Are Facing a Diversity Problem. Here's Why It Matters.," *Econsult Solutions, Inc.* (blog), December 13, 2019; Laura Krantz Globe Staff et al., "Diverse Campuses, but Still Few Black Students - The Boston Globe," BostonGlobe.com, accessed April 21, 2024
[76] Judith R. Gordon, "Judith R. Gordon to Dr. Dennis D. Berkey on Behalf of the New England Association of Schools & Colleges, Inc.," November 8, 2006; Richard L. Pattenaude, "Mr. Richard L. Pattenaude to Dr. Dennis D. Berkey on Belalf of the New England Association of Schools & Colleges, Inc.," November 15, 2012; David Quigley, "David Quigley to Dr. Laurie A. Leshin on Behalf of the New England Association of Schools & Colleges, Inc.," January 12, 2017.
[77] David C. Munsun et al., "Report to the Faculty, Administration, Trustees, Students of Worcester Polytechnic Institute" (New England Commission of Higher Education, 2022); Office of the President, "Lead With Purpose: WPI's Strategic Plan, 2021-2026" (Worcester, MA: Worcester Polytechnic Institute, November 19, 2021), 4,9,11.

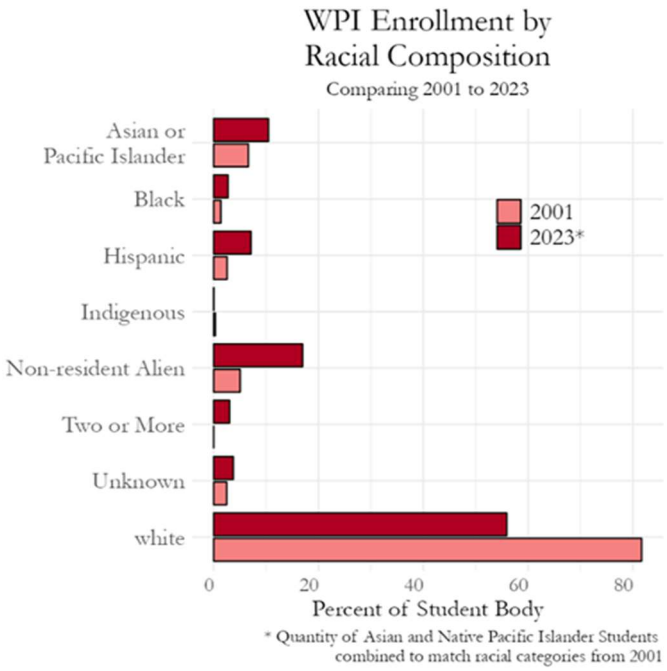

Figure 2) Comparison of WPI's Enrollment by Race in 2001 vs. 2023; See Table 3 and Table 4

Though some progress has been achieved, WPI continues to struggle with diversity. The total student body remains at least 55% white, though this number could be higher accounting for students that listed "unknown/I'd rather not say" on surveys and white "Non-resident Alien" students.[78] Much of the reduction in the percentage of white students can be attributed to increased representation of International and Asian students – which will be important during the discussion of student finance later in this section.[79] Figure 2 also paints a relatively rosy picture of WPI's change in racial demographic. Despite the making up a lower percentage of the student body, the increase in white students' enrollment still more than doubled the next closest racial category. Across the country, not all racial/ethnic identities experience equal barriers to educational attainment. Educational attainment of "Black, Hispanic, Native Hawaiian/Other Pacific Islander, and… [Indigenous]… individuals still lag behind Asian and white individuals and those of two or more races."[80] WPI itself has defined underrepresented minorities (URM) in education in its Student Fact

[78] The racial groups "Non-resident Alien," "Two or more races," and "Unreported" likely contain more than one racial/ethnic group across campus. "Non-resident Alien" also doesn't necessarily imply a person of color. I included it here to give the most optimistic view of WPI's diversity. That said, it is difficult, and in some ways problematic to attempt to classify race.

[79] WPI had four students identify themselves as Native Hawaiian or Pacific Islander in 2023 – continuing a trend of low enrollment. Though not depicted in Figure 2, WPI has counted Asian and Pacific Islander students separately for a portion of the records they've kept.

[80] "Post 5: Racial Differences in Educational Experiences and Attainment," U.S. Department of the Treasury, March 19, 2024

Books as a group including only Hispanic, Black, Indigenous, Native Hawaiian/Pacific Islander, and "Two or more races where at least one of the previously mentioned races has been indicated."[81] These demographics whose educational attainment is lower relative to their peers, though increased in number, still have only represented a maximum of <14% of WPI's student population since the 1990's.[82] Their lack of URM representation undermines the school's argument that they seek diversity for the sake of diversity, equity, and inclusion. Instead, if one makes the evidently strong assumption that the school truly does intend to diversify its student body, the available data indicates that other considerations take precedence.

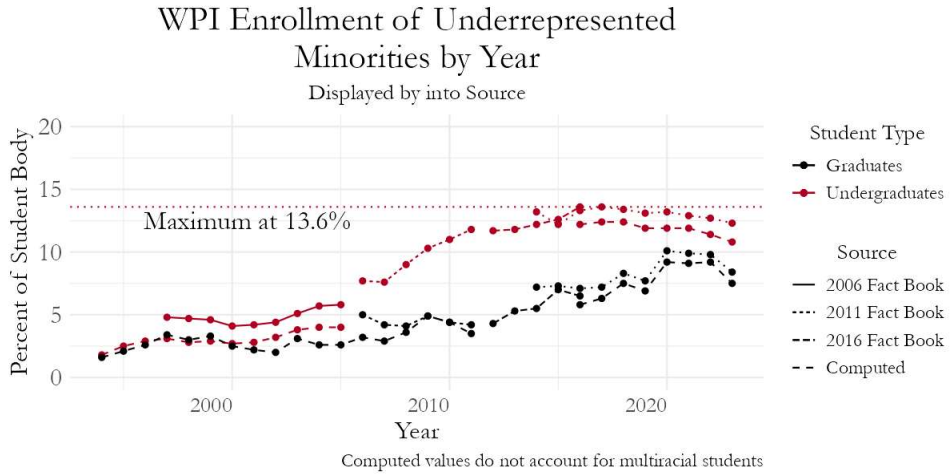

Figure 3) WPI Enrollment of Underrepresented Minorities by Year, Student Type, and Source; See Table 11and Table 12

The process of diversification at WPI has been slow. Despite external evaluations and their own declared commitments, the school continues to hold racial biases that are evident in its enrollment of URM students, which has been relatively static compared to the enrollment growth of Asian and International students. The school has made a small increase in URM enrollment, but, this group, comprised of four distinctly recorded categories, still only makes up somewhere between eight and thirteen percent of the school's total enrollment. Regardless of whether this discrimination results from direct or indirect racism, it is apparent that the drive for increased diversity is overshadowed by some other force within the Institution. The issue of explicit racism at WPI that

[81] Office of Strategic Initiatives and University Analytics, "Enrollment Dashboard | Worcester Polytechnic Institute," Worcester Polytechnic Institute, October 2023.
[82] Not including Asian students here does not represent a statement on their challenges with racism. Like any other minority, these students' experiences are complex and not easily summarized. Here, I chose to make this statement because, on average, students who are Asian, white, or of two or more races have struggled less with educational achievement relative to other racial/ethnic groups since the 1990's according to available statistics.

NECHE addressed in their 2001 evaluation report has also not been effectively addressed.[83] Emboldened by the Black Lives Matter movement in June 2020, over 300 WPI Alumni, all People of Color who graduated anywhere from 1986 to 2020, wrote an open letter to WPI describing their experiences of racism, bias, and fear on campus.[84] In their letter, they urge the school to transform their curriculum and policies (including continuing to diversify the student body) to combat their experiences of "ignorance, inaction, and active malice."[85] Though the school has acknowledged the letter and has committed to creating "action plans," neither these action plans, nor the school's prior work, *Project Inclusion*, are accessible to students or the public.[86] As a result, it's unclear what kinds of plans have been made, how much of those plans have been enacted, or how effective they have been thus far.

While WPI appears to have made some efforts to make their campus more ethnically diverse, ethnicity is not the only demographic category WPI has sought to shape on its campus. The institute has, and likely continues, to target high-income families with their marketing to unburden the institute's financial aid expense. Throughout the 1990's, WPI was in a relatively dire financial position. In 1993, a committee commissioned by the Office of the President submitted their report identifying several factors, including the growing cost of financial aid, that contributed to WPI's financial strain.[87] In response, the institute published an "ambitious plan" in 1999 to improve the institute in which they detail the institute's need to change their undergraduate population, which I believe is best described in the document's own words: "We must develop a[n]…undergraduate pool with a higher ability to afford the cost of attendance and thus decrease the need for need-based financial aid."[88] The plan explicitly details the institute's intent to "increase funding to the Admissions Office to allow targeted recruiting efforts at private and parochial high schools where demand for financial aid may be less"[89]

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[83] Berkey et al., "Report to the Faculty, Administration, Trustees, and Students of Worcester Polytechnic Institute, Worcester, Massachusetts," 15.
[84] WPI Alumni, "To President Laurie Leshin from WPI Alumni," June 8, 2020.; "WPI Alumni Against Racism," Powerpoint, June 6, 2020.
[85] WPI Alumni, "To President Laurie Leshin from WPI Alumni," June 8, 2020, 1.
[86] "WPI Alumni Racial Justice | Worcester Polytechnic Institute," accessed April 17, 2024.
[87] Diran Apelian et al., "Report of the Blue Ribbon Task Force: 'Positioning WPI for the 21st Century'" (Worcester, MA: Worcester Polytechnic Institute, May 21, 1993), UA03: Provost and Vice President for Academic Affairs records, UA03.02.02, Box 3, WPI University Archives.
[88] "New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige; FY2000 to FY2010," 33.
[89] "New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige; FY2000 to FY2010," 33.

While the institute's strategic plans change on a periodic basis, it remains that as time moves forward, WPI has attracted and enrolled fewer students whom it deems eligible of the most common kinds of financial aid compared to campus size. Consider that the number of students who received the most common forms of financial aid (Title VI), seems relatively constant or even trending downward in all income categories with the exception of those students whose families make over $110,000 in gross annual income – a group whose size has been trending upwards (see Figure 4).

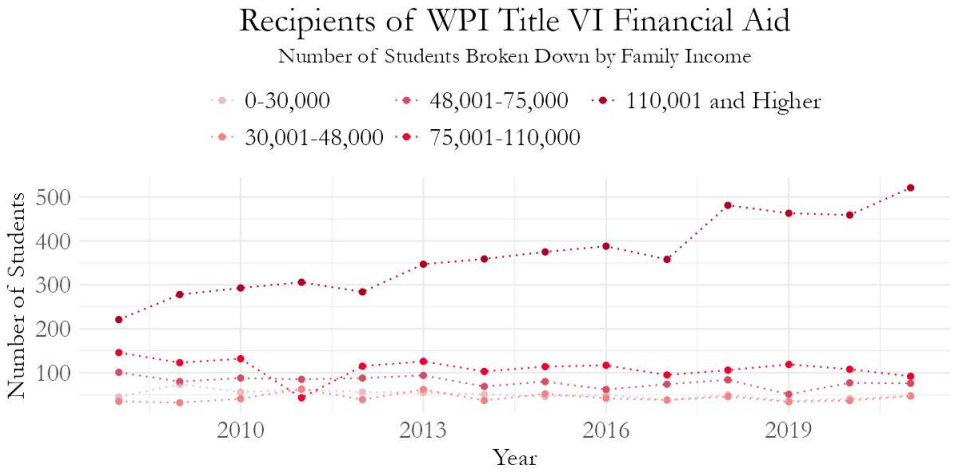

Figure 4) Recipients of Title VI Financial Aid from WPI by Year; See Table 5

However, Figure 4 cannot show the full picture of the available IPEDS data because it doesn't account for the number of students who may have been eligible to receive aid. Plotting the number of students who meet the primary requirement of being a full-time student seeking their first degree/certificate of as a percentage of the total student body over time shows an overall slight downwards trend from 2008 to 2021 (Figure 5). These pieces of evidence indicate that the percentage of the student body who can receive Title VI aid has decreased and, of the students who have been deemed eligible by the Office of Financial Aid at WPI, more and more of them have come from affluent backgrounds over time.

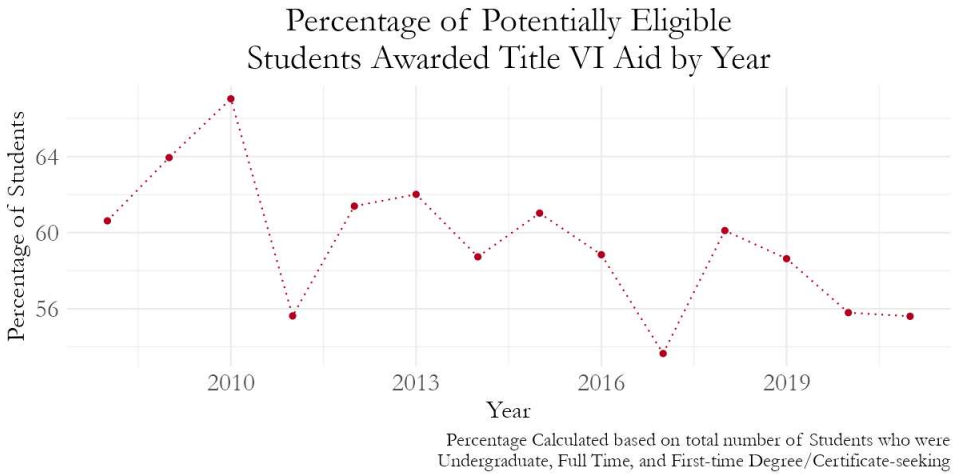

Figure 5) Percentage of Potentially Eligible Students Awarded Title VI Aid by Year; See Table 5

Though the IPEDS Financial Aid data does not represent the demographic of the entire student body, the need-based nature of Title VI financial aid still allows one to carefully draw conclusions about the broader group on campus. This increase in affluence among Title VI recipients is significant because they are the school's largest recipient of aid (by number of students). By definition, they are also exactly the component of the school who is eligible for federal *need-based* financial aid. Here since the rest of the student body was determined ineligible for need-based aid, one could reasonably conclude that the average student from the larger student body has lower financial need than the average student receiving Title VI support. Therefore, the student body ought to reflect at least the economic demographic of the students who qualify for need-based financial aid. A report from the New York Times in 2017 seems to corroborate this extrapolation, stating that the median annual income of the families of WPI students from Class of 2013 was $130,700, the equivalent of $161,381 in 2022 dollars – well above the $110,000 limit to which the school's financial aid report measures.[90]

[90] Gregor Aisch et al., "Economic Diversity and Student Outcomes at Worcester Polytechnic Institute," *The New York Times*, January 18, 2017, sec. The Upshot.

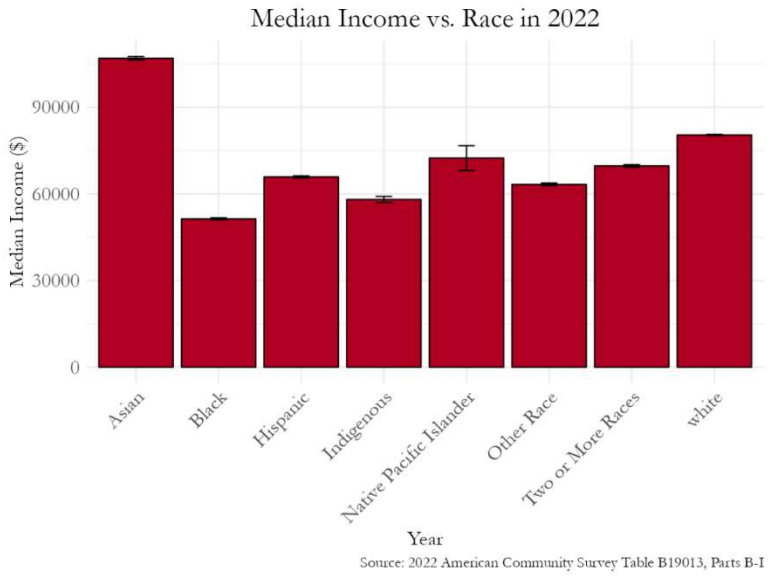

Figure 6) Median Income by Race in 2022

In spite of the Institute's claim to DEI as a core value, students' ability to pay WPI's high cost of attendance explains much of the enrollment changes in the last 24 years. For example, international students, who are ineligible for most forms of financial aid in the U.S., are highly profitable to the school because they must pay the full cost of attendance. Reviewing racial correlations in household income across the U.S. vs. campus enrollment indicates that the school is significantly less accessible to U.S. students from low SES backgrounds. Race has a significant effect on median income in the U.S. per the ACS (Figure 5). For example, people who identified themselves as Asian earned more than twice that of people who identified as Black (see Figure 6). Median Income of a given racial group across the U.S. is a statistically significant predictor of that race's representation in enrollment at WPI ($p = 0.0116$; see Figure 7). This analysis excludes the white students for whom the systemic bias is well established and students who self-identified among the "Non-resident Alien" category for which the median income reported by the ACS does not apply. Note that the origin of these racial discrepancies in income (ultimately pertaining to model minority myths) are well-explained by settler-colonialism.[91] So, to see these disparities so readily translate into the student body with such a basic analysis as this only continues to solidify the school's intentional prioritization of wealth.

[91] Tuck and Yang, "Decolonization Is Not a Metaphor," 18.

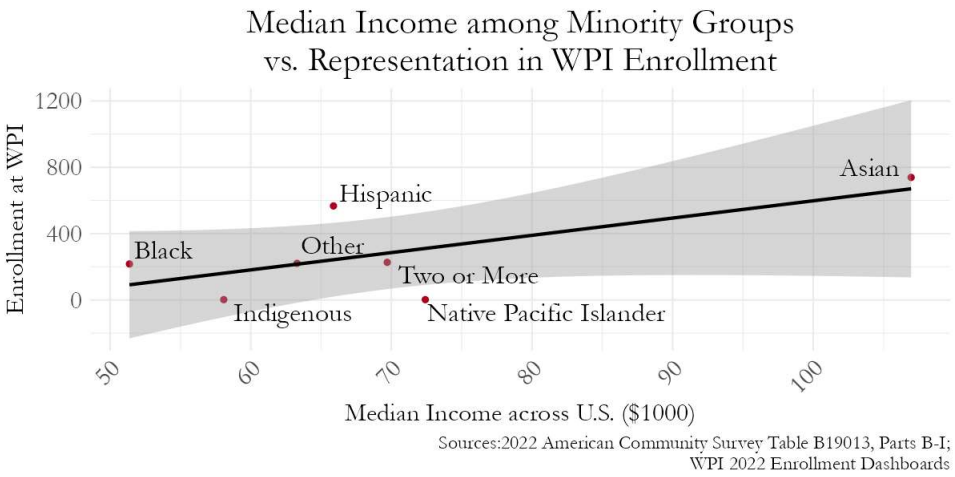

Figure 7) Median Income among Minority Groups vs. Representation in WPI Enrollment

Furthermore, these relationships between income and representation provide a possible explanation for why WPI has struggled to increase its diversity in its student body, suggesting that students from higher-income racial groups are disproportionately represented at WPI. Perhaps this is why Black and Indigenous students, for whom the median household income is the lowest (as of 2022), have among the lowest representation at the school even in 2023. Interestingly, Hispanic students have much higher representation than income would predict alone. This anomaly could indicate additional institutional support or higher demand for WPI among Hispanic families. Yet overall, the underrepresentation of students identifying as Black, Indigenous, and Native Pacific Islander continues relative to other groups on campus, suggesting an institutional bias where wealth is prioritized over access even into 2023. These policies not only continue to build evidence contradicting the school's repeated commitment to diversity, but also continue systemic racial inequalities in educational attainment that drive studentification processes.[92]

Even without having established the outward growth of the institution, one can still identify the foundational beliefs underlying gentrification inherent in WPI's management of its student body. Selective institutions who fail to adequately represent low-income and URM students on their campuses consistently fail as a means of economic mobility and instead "perpetuate privilege and increase [existing] gaps in wealth."[93] WPI's highly privileged student body stresses the school's engagement in cycles of white capital benefitting groups who are already privileged (like their

[92] Nick Revington et al., "Universities and Urban Social Structure: Gentrification, Studentification, and Youthification in Five United States Legacy Cities," *Urban Geography* 44, no. 1 (January 2, 2023): 83–104.
[93] Office of the Under Secretary, "Strategies For Increasing Diversity and Opportunity in Higher Education" (U.S. Department of Education, September 2023).

primarily white student body) – mirroring basic motivators underlying a gentrification process.[94] Additionally, racial discrimination does not end with students. As outlined in Section 2.2, Studentification transforms neighborhoods through an influx of students, and often leads to racial segregation, driven, in part, by racial disparities in access to education and the biases of institutions like WPI.[95] The historical evidence of implicit and explicit racism at WPI shows that that the school will continue exacerbate the existing racial disparities of Worcester should it force students into the city. Therefore, while it cannot establish the process' presence on its own, racial segregation is a relevant measure for gauging the impact of studentification near WPI once the existence of the latter has been established.

The Institute's student body is not just racially privileged, it is also financially privileged by design. The ability to obtain financial means is a significant component of establishing the capability of a student body to transform a space because the process relies on student capital.[96] The disparity between local residents' and WPI students' access to wealth only compounds their ability to outcompete current residents. Suppose like the school does, that the average student will be able to afford the cost of attendance, whether through financial aid, student loans, scholarships, family money, or other means. In 2022, WPI's estimated cost of attendance was nearly $75,000 for 10 months of the year. Students' ability to flexibly access wealth is privilege alone, but the disparity increases when examined in the context of Worcester. Though the school's student body is able to pay for tuition and fees increasing significantly faster than inflation (see Table 10), the income in Worcester is decreasing with time. Adjusted for inflation (to 2022 dollars), the median income in the City of Worcester decreased from a little under $93,000 per year in 2010 to $80,177 in 2022. Despite making less income, the median gross rent in Worcester – about a third of the monthly cost of living – increased over the same period from $1,181 to $1,375 (adjusted to 2022 dollars; see Table 2). WPI's strategic management of its student body's racial and capital privilege over the communities in Worcester leaves it well-positioned to transform the city. However, one crucial element of displacement as a component of studentification is that students move into a particular area. I have yet to establish that WPI students live off-campus at all – much less that they are seeking housing

[94] Margaret Ellis-Young, "Gentrification as (Settler) Colonialism? Moving beyond Metaphorical Linkages," *Geography Compass* 16, no. 1 (2022): 4.
[95] Nick Revington et al., "Universities and Urban Social Structure: Gentrification, Studentification, and Youthification in Five United States Legacy Cities," *Urban Geography* 44, no. 1 (January 2, 2023): 83–104.
[96] Darren P. Smith, "'Studentification Ication': The Gentrification Factory?," in *Gentrification in a Global Context: The New Urban Colonialism*, ed. Rowland Atkinson and Gary Bridge (London: Routledge, 2004), 73–90

further from campus each year. So, I'll next show exactly that by discussing WPI's indirect and direct management of the student body's spatial housing distribution.

4.2 WPI Students in the City of Worcester

By analyzing factors that either encourage or discourage on-campus living, in this section, we'll explore the distribution of WPI's student body each year: centered around campus and distributed through nearby neighborhoods. I'll establish that the expansion of WPI's enrollment, in combination with its relatively lagged housing capacity in the last 20 years is aligned with the theoretical foundations of studentification. By definition, the equilibrium between all forces pulling the student body closer to and away from campus gives rise to the distribution of WPI's student body across the city. This distribution depends on the size of the student body itself, and the net effect is to spread students further from the campus center as the number of enrolled students increases. Thus, we will show that Moos' proximity is an appropriate approximation for WPI's student body, and that the process of studentification in Worcester has already begun.

Off-campus students do not distribute themselves evenly across an area. Not only do they tend to cluster together into "student-only enclaves," they also tend to live nearer to the school than not.[97] WPI implicitly and explicitly incentivizes students to value housing closer to campus over housing further away. When closer to campus, they have easier access to the academic facilities they take courses in, the health care they have access to, and the other resources and activities to which they gain access through attending WPI. Hence, by the nature of the institution working on a localized campus, students are implicitly motivated to live nearby. The school also explicitly markets the campus toward students, saying that students who live on campus have, "greater…success in college," because of their increased access to university resources.[98] Though there are compelling incentives to live near campus, there are also forces that work to distribute the student body at WPI toward the surrounding communities. Even if motivated to live near campus, increasing enrollment necessarily pushes students to look further from the school. Within a given finite distance from the school, the amount of total land area is finite. Therefore, the number of housing units is bounded above by a finite value because a housing unit requires a strictly positive amount of space.

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[97] Markus Moos et al., "The Knowledge Economy City: Gentrification, Studentification and Youthification, and Their Connections to Universities," *Urban Studies* 56, no. 6 (May 1, 2019): 1075–92.; Daniel T. Gross, "Studentification, Racial Inequity, and Rust Belt Revitalization: A 'Longitudinal' Exploration of the Demographic Impacts of Studentification in the City of Binghamton and the Village of Johnson City, NY (2000 – 2023)" (M.A., United States -- New York, State University of New York at Binghamton, 2023), 24

[98] Worcester Polytechnic Institute, "Living On Campus," accessed April 12, 2024.

Furthermore, Worcester's housing capacity within a set distance from the school is relatively static with the exception of some small variance occurring from new construction and renovation (which I assumed occur in a minority of homes per year). Once the existing housing is full, students who choose, or are forced, to live off-campus must look further from the school to find housing in order to attend. Therefore, one could reasonably conclude that there is a positive relationship between the number of off-campus students and the average distance they live from campus – recovering Moos' proximity in the process.

By definition, students attending WPI who cannot or do not live on campus must live off-campus. Since its enrollment began to increase in the mid-2000's, the school's housing capacity has become increasingly inadequate compared to its enrollment. Though the school's total housing capacity has increased steadily since 2008, the student body has grown much faster (See Table 10 and Table 13). As a result, in the Fall of 2022, the school could not house its 7308 students within its 2369 total institution-controlled housing capacity.[99] The cost of living in student housing at WPI is also much higher than living in the surrounding neighborhoods. For example, the school estimated the yearly room cost per student living on campus in Fall 2022 was $9,482 ($948.20 per month for 10 months; see Table 13). During that same year, the ACS estimated that within the City of Worcester, occupied rental units housed a median of 2.27 people per unit paying a total median housing cost of $1,375 per month (see Table 2).[100] So, in 2022, while the average cost per unit student at WPI was $948.20 per month, the average cost per unit resident in the City of Worcester was $605.73 per month. However, this relationship is not necessarily equal. Anecdotally, many students live with other students when living off campus – effectively allowing them to split rent into multiple equal components. Yet, that ability to pay is not guaranteed for each of the 2.27 median occupants of a unit in Worcester (e.g. a parent and a child). So not only is housing more accessible to WPI students on average by virtue of the student body's racial composition and access to wealth, but their ability to live in groups that share the cost of living effectively subsidizes the cost of rent. The lower $605.73 is more accessible to students than residents of Worcester – particularly families with children. The more than $300 difference each month just in rent is a significant reason

[99] While it's not true that all students live on-campus given the opportunity, many commuters still choose to live as near to campus as possible. Here I don't consider long-distance commuters because their "access" to campus is roughly constant throughout the city. So, by Moos' Proximity, long-distance commuters would be much more evenly distributed, thus contributing much less to the localized phenomena with which this project is concerned.

[100] US Census Bureau, "Selected Housing Characteristics" (U.S. Census Bureau, 2022); US Census Bureau, "Median Contract Rent (Dollars)" (U.S. Census Bureau, 2022).; US Census Bureau, "Financial Characteristics" (U.S. Census Bureau, 2022).

a student might consider living off campus. The difference is more than enough to cover the cost of renting for a full year and still cost less than living on campus for 10 months.

Considering the constraints of WPI's housing capacity together with the forces incentivizing students to live near vs. far from campus, there must be a positive relationship between WPI's enrollment and the spread of the student body into the city. In total, WPI's lack of housing capacity has pushed students into the city. Most students are unable to live-on campus, and those who live in the city likely have more access to capital than existing residents, and thus enjoy the benefit of more choice in location. Because students are motivated to live near campus, the relative "desirability" of a given census block is inversely related to the distance of that census block to the school. As a result, when we look at the distribution of race across the City of Worcester for a given year, we expect some amount of homogenization near the school toward the WPI's distribution of race that year (rather than the city's). Given the school's continued racial bias; their development of a racially privileged, highly wealthy student body; their rapid expansion of that student body without having adequate housing capacity; and their proximity to pre-existing multiple-occupation housing that has historically been home to lower SES groups, WPI's strategic actions have not just met the conditions for studentification to occur - they have encouraged it.

4.3 Measuring Neighborhood Segregation near WPI

Having established that WPI is engaging in the studentification – and therefore gentrification – of Worcester, I built some statistical models to evaluate the presence of racial segregation. Using a library in R called tidycensus, I imported the census block geographic information for the last three decennial censuses and plotted the location of each higher educational institution in Worcester (see Table 6; Figure 9). With the locations of each university established, I tabulated the enrollment of each institution in 2001, 2010, and 2020, calculated the geospatial distance, and walking time from every census block to each school using "mapboxapi" for the latter two. From these values I calculated the proximity of every census block to each school for the 2000, 2010, and 2020 census. My next step was to establish the heterogeneity of racial distributions across Worcester. Aside from Native Hawaiian/Pacific Islanders who have a statistically insignificant presence in the city for all three analysis years, Moran's I was positive and statistically significant for all years. I also calculated the city-wide and local segregation indices across Worcester for each analysis year (see Figure 9).

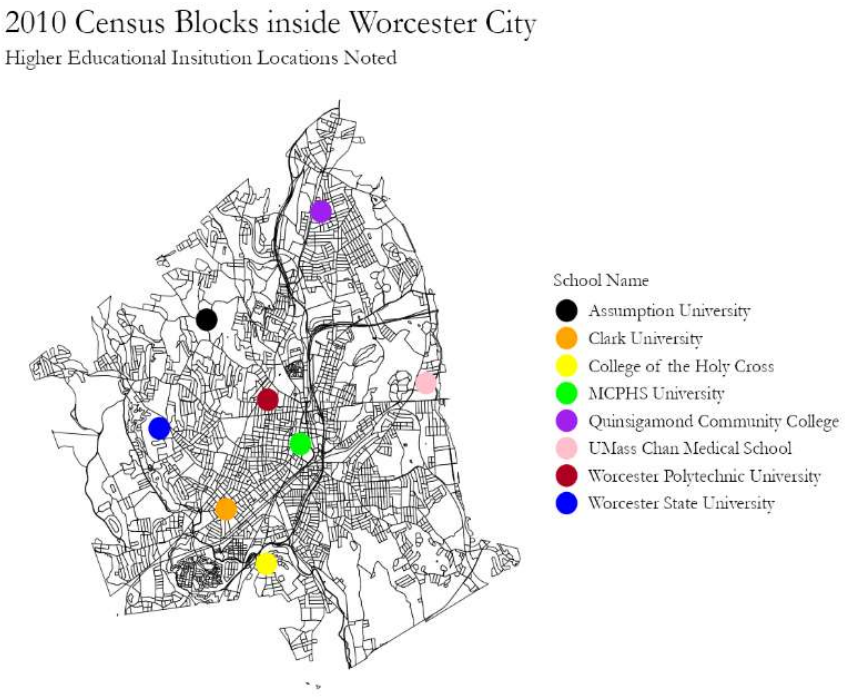

Figure 8) 2010 Census Blocks and University Locations. Sources: tidycensus Library. RStudio; Table 6

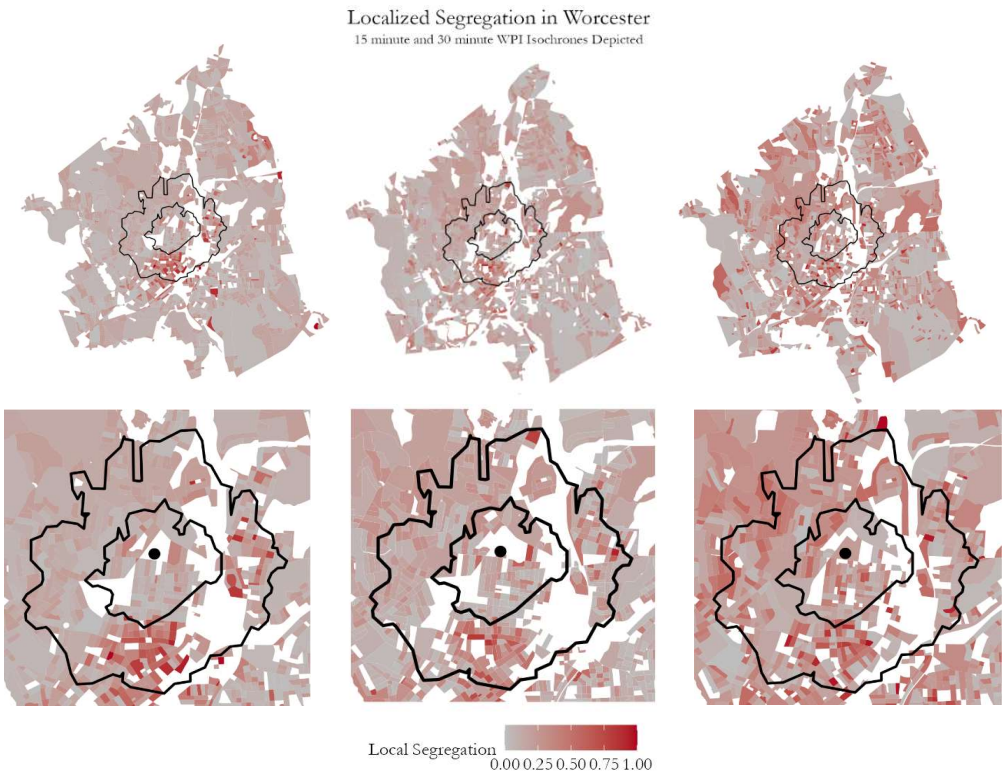

Figure 9) Local Segregation in Worcester, from left to right: 2000, 2010, 2020. Top row depicts the entire City of Worcester. Bottom Row is cropped to just outside WPI's 30 Minute Isochrone. White space contains no recorded residents.

Though the measurement doesn't establish the statistical link between the two, Figure 9, strongly suggests that racial segregation is occurring near WPI. Between fifteen and thirty minutes south of WPI has been more segregated that the surrounding areas throughout the 21st century. However, elsewhere, the plot shows much higher segregation near WPI as time moves forward. The relative lack of segregation in 2000 despite WPI's monolithically white racial distribution at the time is likely a matter of size. Though white students comprised a much higher percentage of the student body in 2000 compared to 2020, the student body was half the size. Given Moos' Proximity measurement, it may have been that WPI's "effective radius" into the city was still too close to campus for this dataset to adequately measure. Another important result of this graph is the increase in housing near campus. Particularly in 2010, there is a significant amount of white space in and around campus where no residents were recorded in the Decennial Census. This could indicate that the school has purchased more land as part of its steadily increasing housing capacity, or it could indicate that other developers.

Though the measurement in Figure 9 is highly anisotropic, I plotted an isotropic representation of segregation with respect to walking time from WPI using the conditionally

smoothed mean (see Figure 10). Overall, upon basic visual inspection, the plots in Figure 9 and Figure 10 appear to show increases in segregation around WPI were most drastic near the school, particularly to the south where the working class of Worcester has historically resided in the still-present 19th century multi-occupation housing. This initial result is well-explained by studentification, as described on page 7. Though the conditionally smoothed means in are not statistically significant models of segregation, I suspect that this is largely due to the anisotropy of the system. Given a particular direction of travel, I think these models may have much better statistical power, but this remains to be seen. What is clear is that they are distinct from year to year. Blocks closest to WPI experienced the largest change in segregation over the last 24 years compared to blocks further away – even including other higher-educational institutions. A reasonable explanation for the comparatively large leap in segregation near the school from 2000 to 2010 compared to 2010 to 2020 could be that the most vulnerable residents left the area during the latter period, possibly due to WPI or the international housing crisis, or some combination of these and other factors. Regardless of the reason, the discrepancy between 2000 to 2010 and 2010 to 2020 seems to indicate that the remaining residents were either more resilient or underwent less housing strain from 2010 to 2020.

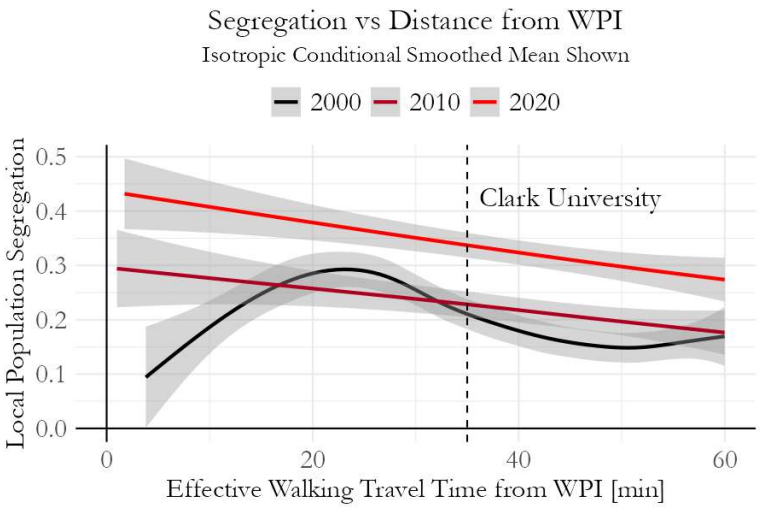

Figure 10) Segregation vs. Walking Time from WPI

The last step was to build an appropriate statistical model for the segregation in Worcester as predicted by proximity to universities in the city. In no year was a standard linear regression effective; though proximity to WPI and Clark were both statistically significant, the model still

contained significant spatial autocorrelation in all three cases. This continued spatial autocorrelation indicates the presence of additional "spillover" effects corresponding to some unknown process. To attempt to resolve this issue, I built a set of spatially lagged models. These models can describe how the amount of segregation of a certain census block 'ripples outward' to other nearby census blocks. In 2000, proximity to Clark University was the only statistically significant predictor of segregation among all schools when using a spatial lag model. However, in 2010 and 2020, both WPI and Clark were statistically significant predictors of segregation using a spatial lag model (see Table 14**,** Table 15, and Table 16). Interestingly, the residuals from all three spatial lag models were highly non-normal and were unresponsive to power, log, or inversion transformations. I believe this is likely because the mutual information index in Worcester is highly non-normal; a nonlinear model may be necessary in future research. The spatial lag model removed the autocorrelation and increased the amount of variance explained by the model by an order of magnitude (though the explanatory power remains low). So, in some sense, the error is consistent, but remains relatively large. This could be because of the high non-normality in the segregation measurement, or it could be that there are more variables affecting the location of segregation. Future work should work to refine the distribution of students and the measurement of segregation. For example, perhaps one could measure segregation between sets of racial distributions (e.g. Worcester's racial distribution vs. Clark vs. WPI…etc) rather than sets of single groups. Alternatively, this excessive variance could be explained by the anisotropy of the segregation, or perhaps other factors influencing students desire to live in a particular census block like the availability of MO housing and low rent. The overall picture from these models is two-fold. First, racial segregation is occurring in the City of Worcester over time. Second, proximity to WPI is a statistically significant predictor of racial segregation, but there could more factors affecting the process that have yet to be explained. Regardless, this segregation process occurring in Worcester aligns with the expected results of studentification.

5 Conclusion

The results of this study are simple: WPI is driven to make higher profit at all costs – even the cost of people's livelihood. As a tuition-based school, WPI has supported its growth by increasing its enrollment via incoming classes who are more and more able to pay high tuition costs that continue to increase significantly faster than inflation. The increase in student housing, though reasonably steady since 2008, has not nearly kept up with WPI's enrollment. The typical cost of room (and board) at WPI has also increased faster than inflation, reflecting the increased competition for living space on campus caused by increasingly inadequate housing capacity. After 20 years of sustained

pressure by their accrediting body, the school has not adequately addressed the issues of racism on campus and has increased its diversity not by increasing its representation of the groups whose barriers to education are the highest. Instead, it conceded to enrolling fewer white students, and focused its expansion on international students who are more profitable to the school because they are ineligible for financial aid. These factors suggest that WPI has developed a wealthy, highly privileged student body that is already engaging in the studentification of Worcester. Though they require further refinement, the statistical findings of my analysis on the segregation surrounding communities are consistent with Moos' proximity and empirical findings of neighborhood segregation arising from studentification, both in WPI's theoretical setting and statistical result. Given that gentrification is occurring through an increase in students, it's reasonable to classify the process as studentification.

As established, the studentification of an area has a negative impact on property values near where the students live. As a result, I expect the cost of land and property in the area to become cheaper relative to land that has not undergone these same processes in Worcester. Because WPI has interest in land, this degradation of property value ultimately suits its goals of maximizing its own profit. By continuing to convert surrounding communities to student housing, WPI is engaging with the city as a developer who is accumulating influence over land for profit that disproportionately benefits upper-class racially-privileged groups. The school must acknowledge that by engaging in this process they implicitly claim the right to develop the city – using settler colonial ideologies to justify practice social injustices against the residents of the City of Worcester. The school has expanded beyond its own financial and spatial resources, and now the community of Worcester must pay the difference. While WPI may have changed in many ways over the last century and a half, its foundations in settler colonialism have not. I am urging the school to examine its deep ties to settler colonialism and ideologies of displacement through more than just student projects. As an institution of higher education, WPI can empower the process of decolonization and redress if only it chooses to do so. The understanding of WPI's role in using settler colonial ideologies to maintain control and growth is not part of the official story WPI has told about itself, but it should be. Telling the full story behind WPI's acquisition of wealth and status is but the first step in the school's long path to decolonization.

Appendix A) Mathematical Theory

A-a) Proximity and Effective Access

Moos' measure of Proximity is based on two fundamental concepts: that students tend to cluster where they have easy access to institutions they attend, and that housing is finite near those institutions.[101] Moos et. al. defined as the number of students at a given school divided by the school's distance to a given **census tract:**[102]

$$P_{i,j} = \frac{S_i}{d_{i,j}}$$

Equation 1) Moos' Proximity

Where $P_{i,j}$ is the proximity of school i to location j, S_i is the enrollment at school i, and $d_{i,j}$ is geospatial distance from school i to location j. The global/spatial distance that Moos used assumes that the time to travel a given distance in any given direction from a specified point is constant – effectively drawing a circle around the point at a given radius. On a scale of dozens of miles, this global/spatial distance that Moos used may be a fair predictor of the travel time. However, on a smaller scale like the census blocks used in this research, property shapes locations, the availability of sidewalks, and other elements of location topology can greatly increase the variability of the travel time to a given distance (as evidenced by the highly non-circular isochrones calculated for Figure 9).

Since Moos' metric is designed to measure the accessibility of the school, I decided to check the assumption by modifying the distance metric to represent an "effective distance" that accounts for the real-world time to travel from location j to school i. I calculated this travel time with RStudio's mapboxapi library. Mapboxapi allows for estimates of driving time, driving time with traffic, walking time, and cycling time. I have no way of estimating how many cyclists are on campus, but anecdotally the number is relatively small compared to the number of students who drive or walk.

Now the question was to choose how to choose between driving or walking times. In 2019, the average one-way commute across the United States was 27.[103] Since the City of Worcester (as

[101] Moos et al., "The Knowledge Economy City," 1082.
[102] Moos et al., 1083.
[103] US Census Bureau, "Census Bureau Estimates Show Average One-Way Travel Time to Work Rises to All-Time High," Census.gov, accessed March 20, 2024.

defined by the subcounty area "Worcester City" in the 2020 US Decennial Census) only takes between 10 and 15min to drive across, the relative accessibility of campus by car is roughly constant across the city. So, I chose to define distances from the walking times. Now, I wanted to make sure that I kept the same units as Moos so that this study can be easily checked. However, we can convert time to distance via speed – both of which are measurements available to me.

$$d = v \cdot t$$

Where distance is d, v is speed, and t is time. To calculate speed, I took the spatial distance from a given census block to a school (the same measure of distance as Moos) and divided it by the expected travel time according to mapboxapi. For the same reason geospatial distance inaccurately predicts travel time, this approximate velocity varies by whichever school/tract pair you select. However, looking at the distribution, the confidence intervals are very small. With a 95% confidence interval, the average walking speed mapboxapi predicts from any given tract to WPI is between 2.492 and 2.5103 mph including environmental features. I also checked the distances from all the other schools:

Table 1) Average Walking Speed from Worcester Schools to Census Blocks

Averaged Walking Speed from Schools to Worcester Census Blocks			
School Name	Lower Bound (95% confidence) [mph]	Average Value [mph]	Upper Bound (95% confidence) [mph]
Assumption University	2.3869	2.3974	2.4077
Clark University	2.5657	2.574114	2.5826
College of the Holy Cross	2.465101	2.477159	2.489322
MCPHS University	2.604622	2.6123	2.619893
Quinsigamond Community College	2.515126	2.526961	2.538647
Umass Medical School	2.39907	2.409693	2.420315
Worcester Polytechnic University	2.492075	2.501296	2.510394
Worcester State University	2.462905	2.47148	2.480105
Averaged Velocity to Schools from Tract	2.49195	2.4963	2.50065

Given that the distribution of walking speeds was so close, I used the average velocity to determine an "effective" distance from every census tract, with index i, to a given school:

$$v^* = \mathbb{E}(v) = \mathbb{E}(d/t)$$

$$d^*_{i,j} = v^* t_i$$

Which I then used to recreate Moos' proximity as:

$$P_{i,j} = \frac{S_i}{d^*_{i,j}}$$

A-b) Mutual Information Index

When studying relationships between categorical variables, populations in particular, it is useful to be able to summarize the dynamics between multiple categories into one number. Suppose we have some dataset T. On that data set we have some number of units, n_U, and we are interested in summarizing information about some number of groups, n_G. Then the Mutual Information Index, *M*, is computed:

$$M(T) = \sum_{u=1}^{n_U} \sum_{g=1}^{n_G} \mathbb{P}(u,g) \log\left(\frac{\mathbb{P}(u,g)}{\mathbb{P}(u)\mathbb{P}(g)}\right)$$

Equation 2

Where $u \in U$ is a unit (typically some area, like a census tract, in our case), $g \in G$ is a group, $\mathbb{P}(u,g)$ is the joint probability of a randomly selected person being in unit u and group g, and where $\mathbb{P}(g)\ \mathbb{P}(u)$ are the probabilities of randomly selecting u and g, respectively[104].

M is not simply a measure of dissimilarity. In effect, *M*, compares how our groups are distributed in some unit to the overall distribution across all units. For example, if a large school district has enrolled 600 instructors with Bachelor's degrees, 300 with Master's degrees, and 100 with Ph.D.'s across 10 large high schools, we would expect about 60, 30, and 10 instructors with a Bachelor's degree, Master's degree, and Ph.D. at each school, respectively. However, suppose we go to a random school and discover all 100 instructors with a Ph.D. are teaching there. Because this is far from what we expected given the distribution of degrees at the district level, we are able to say much more about the distribution of instructors at other schools. In other words, we could say that knowing we were at school *x* gives us more information about the average instructors' level of education because the distribution at *x* was so different than our initial assumption.

[104] Kyle E. Walker, *Chapter 8 Modeling US Census Data | Analyzing US Census Data* (CRC Press, 2023).

This sharing of information is the source of the name *Mutual Information Index*. *M* represents a measure of how much information knowing one variable gives us about the other[105].

Appendix B) Residuals Panels for Spatial Lag Models

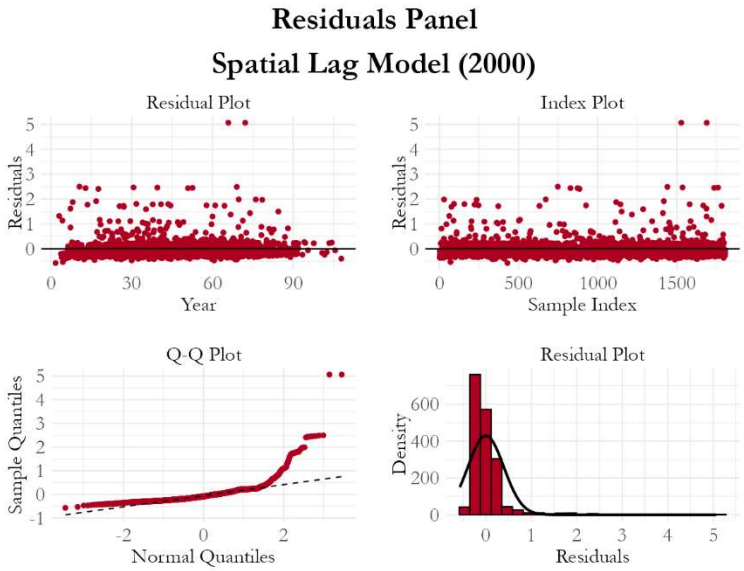

Figure 11) Residuals Panel for Spatial Lag Model for 2000

[105] Ricardo Mora and Javier Ruiz-Castillo, "Entropy-Based Segregation Indices," *Sociological Methodology* 41, no. 1 (August 1, 2011): 171.

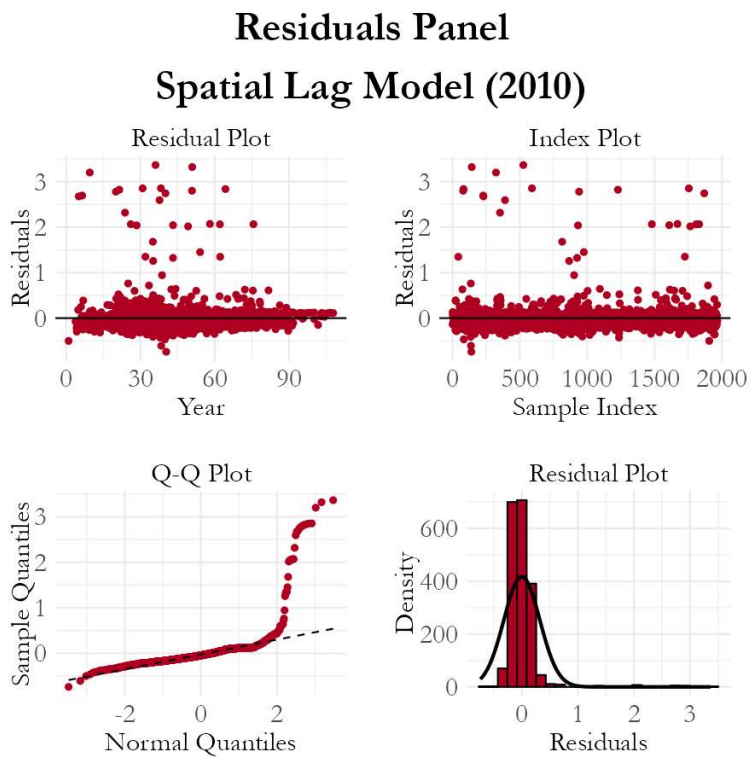

Figure 12) Residuals Panel for Spatial Lag Model for 2010

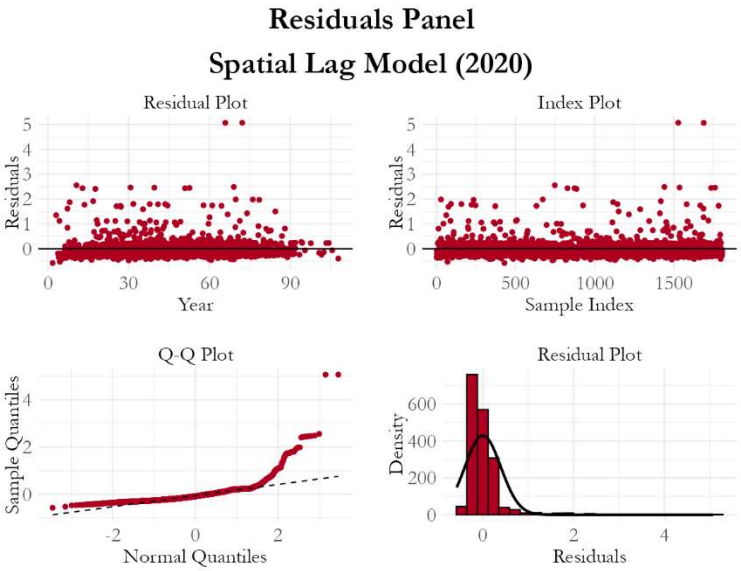

Figure 13) Residuals Panel for Spatial Lag Model for 2020

Appendix C) Glossary

Accreditation: In the US, accreditation is a formal review process for higher educational institutions and their programs conducted by private, nongovernment entities to ensure the programs' quality and improve institutions.[106]

ARIMA: ARIMA (or Autoregressive Integrated Moving Average) models are a specific type of highly generalized linear model used for time series forecasting.[107]

Census Blocks: A census block is the smallest geographic unit evaluated by the U.S. Census Bureau, making it the fundamental unit for their collection of demographic data in America.[108] Census blocks are not designed based on population (many have a population of zero), but rather by visible and invisible geographic features like roads or property lines.[109]

Census Tracts: A census tract is a "small, relatively permanent statistical subdivision of a county" that provides the U.S. Census Bureau a stable geographic unit for presenting statistical data.[110] The boundaries of Census Tracts are adjusted to contain about 4000 people, though can have anywhere between 1200 and 8000 in practice.[111]

Stationary (Stationarity): Stationarity is label for time series data that has statistical properties (like mean, variance, and autocorrelation) that remain constant with respect to time.[112]

Time Series: A time series is data that is recorded at a constant sampling frequency over some time period.

[106] "Becoming Accredited," New England Commission Higher Education, accessed April 22, 2024; "About Accreditation | Council for Higher Education Accreditation," accessed April 22, 2024.
[107] Robert Nau, "Introduction to ARIMA Models," accessed April 24, 2024.
[108] US Census Bureau, "What Are Census Blocks?," Census.gov, accessed April 22, 2024.
[109] US Census Bureau.
[110] US Census Bureau, "Glossary," Census.gov, accessed April 22, 2024.
[111] US Census Bureau.
[112] Robert Nau, "Stationarity and Differencing of Time Series Data," accessed April 23, 2024.

Appendix D) Tabulated Data

Table 2) Median Income and Median Housing Cost for Renters in Worcester by Year

Median Income and Renter Housing Cost in Worcester by Year							
Data Point Unavailable				Data Unavailable for Year			
Year	Median Income (2022 Dollars)	Margin of Error (90%)	Median Home Monthly per Resident	Median Gross Monthly Rent	Margin of Error (90%)	Average Household Size of a Renter-Occupied Unit	Margin of Error (90%)
2022	$ 80,177.00	$ 3,186.00	$ 605.73	$ 1,375.00	$ 48.00	2.27	0.12
2021	$ 82,152.28	$ 3,230.36	$ 541.31	$ 1,353.27	$ 57.24	2.5	0.14
2020							
2019	$ 79,128.59	$ 2,995.73	$ 559.04	$ 1,296.96	$ 38.92	2.32	0.14
2018	$ 83,549.45	$ 3,890.30	$ 591.78	$ 1,295.99	$ 40.79	2.19	0.13
2017	$ 86,042.62	$ 2,842.74	$ 558.08	$ 1,216.61	$ 41.79	2.18	0.11
2016	$ 87,906.12	$ 3,291.05	$ 569.97	$ 1,242.53	$ 40.24	2.18	0.1
2015	$ 87,114.80	$ 3,332.57	$ 569.10	$ 1,252.03	$ 38.28	2.2	0.12
2014	$ 80,258.35	$ 3,167.17	$ 471.21	$ 1,201.59	$ 50.68	2.55	0.14
2013	$ 84,251.20	$ 2,905.73	$ 450.08	$ 1,143.20	$ 35.18	2.54	0.14
2012	$ 85,424.10	$ 3,269.51	$ 470.16	$ 1,147.20	$ 38.24	2.44	0.14
2011	$ 89,364.65	$ 2,993.70	$ 483.81	$ 1,117.59	$ 41.63	2.31	0.12
2010	$ 92,978.65	$ 4,603.44	$ 513.50	$ 1,181.06	$ 38.92	2.3	0.13

Sources: US Census Bureau. "Mean Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1902, 2010-2019. Accessed on April 2, 2024;US Census Bureau. "Mean Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1902, 2021-2022. Accessed on April 2, 2024.

Table 3) Total Undergraduate Enrollment at WPI disaggregated by Race and Fall Year

WPI Undergraduate Enrollment											
Group Not Recorded						Data Unavailable for Year					
Fall Year	Total Enrollment	Asian	Asian or Pacific Islander	Black	Indigenous	Hispanic	Native Hawaiian or Pacific Islander	Non-resident Alien	Two or More*	white	Unknown
2023	5633	685		152	3	448	4	538	192	3468	143
2022	5246	624		143	2	452	2	366	190	3337	130
2021	5064	542		145	1	455	3	338	191	3374	15
2020	4892	380		134	6	440	3	363	157	3068	341
2019	4761	298		142	11	413	2	410	123	2921	441
2018	4668	223		137	14	426	2	435	104	2885	442
2017	4435	149		128	19	405	0	475	90	2764	405
2016	4214	172		112	16	386	0	463	113	2642	310
2015											
2014											
2013											
2012											
2011	3627	192		99	7	270	0	418	89	2486	66
2010	3416		220	103	22	225		333		2428	85
2009	3273		208	102	16	200		293		2410	44
2008	3075		193	91	13	147		262		2319	50
2007*	2981		190	77	15	106		222	28	2319	24
2006	2816		166	68	11	104		192	34	2224	17
2005	2806		168	50	10	103		146		2248	81
2004	2759		172	47	16	94		125		2241	64
2003	2710		190	35	10	93		99		2230	53
2002	2711		180	32	8	80		129		2191	91
2001	2708		179	37	8	69		137		2211	67

2000	2701		190	37	8	66		134		2194	72
1999	2675		184	47	8	69		136		2207	24
1998	2671		158	49	10	66		157		2226	5
1997	2638		166	45	11	70		150		2194	2
1996	2554		153	42	6	67		130		2156	0
1995	2529		140	32	4	58		152		2143	0
1994	2676		156	37	4	43		150		2286	0
Sources: WPI Student Fact Books for FY 1994-2011, 2016; WPI Common Dataset 2012-2013											

Table 4) Total Graduate Enrollment at WPI disaggregated by Race and Fall Year

WPI Graduate Enrollment											
Group Not Recorded						Data Unavailable for Year					
Fall Year	Total Enrollment	Asian	Asian or Pacific Islander	Black	Indigenous	Hispanic	Native Hawaiian or Pacific Islander	Non-resident Alien	Two or More*	white	Unknown
2023	1900	98		54	0	88	0	740	37	744	139
2022	2062	115		74	0	115	0	734	37	896	91
2021	2006	100		65	1	117	0	638	39	991	55
2020	2028	124		76	1	108	1	641	37	990	50
2019	2133	115		57	1	89	1	814	34	974	48
2018	2206	113		65	3	96	1	850	29	1011	38
2017	2207	111		62	1	74	2	935	32	956	34
2016	2063	100		44	3	72	1	900	23	887	33
2015											
2014											
2013											
2012											
2011	1557	76		18	1	35	0	549	19	775	84

2010	1354		87	28	1	31		415		743	49
2009	1153		74	27	2	28		356		633	33
2008	363		10	6	1	6		221		114	5
2007*	911		46	13	1	12		290	12	528	9
2006	895		46	12	1	16		235	16	547	22
2005	837		53	8	2	12		244		497	21
2004	431		19	3	1	7		223		178	0
2003	423		13	6	0	7		238		155	4
2002	840		33	9	0	8		349		439	2
2001	831		37	8	0	10		346		422	8
2000	1057		43	9	1	16		348		635	5
1999	1091		52	13	0	23		280		717	6
1998	1051		60	9	0	23		219		740	0
1997	1032		57	15	1	19		191		747	2
1996	731		45	7	0	12		158		507	2
1995	753		33	8	1	7		166		538	0
1994	740		39	6	0	6		135		548	6
Sources: WPI Student Fact Books for FY 1994-2011, 2016; WPI Common Dataset 2012-2013											

Table 5) Financial Aid Disbursements at WPI by Student Income

WPI Financial Aid Outcome								
Fall Year	Enrollment and Recipient Quantities			Income Level of Recipients as listed on FAFSA				
	Total Enrollment	Number of Eligible Students*	Number of Recipients of Title VI Aid	0-$30,000	$30,001-$48,000	$48,001-$75,000	$75,000-$110,000	$110,001+
2021	7230	1410	784	48	47	76	92	521
2020	6920	1294	722	41	37	77	108	459
2019	6894	1199	703	36	34	51	119	463
2018	6874	1276	767	50	46	84	106	481
2017	6642	1124	603	38	38	74	95	358
2016	6642	1120	659	50	42	62	117	388
2015	6573	1093	667	46	52	80	114	375
2014	6381	1054	619	51	37	69	103	359
2013	6296	1,103	684	55	62	94	126	347
2012	5957	948	582	56	39	88	115	284
2011	5778	1,005	559	62	63	85	43	306
2010	5360	910	610	56	41	88	132	293
2009	4979	918	587	74	32	80	123	278
2008	4561	904	548	45	35	101	146	221
Sources: National Center for Education Statistics. 2008-2022. "WPI Reported Data: Financial Aid and Net Price." IPEDS Data.								

Table 6) Locations of Higher Educational Institutions in Worcester

Higher Educational Institutions in the City of Worcester			
Name	Address	Latitude	Longitude
Assumption University	500 Salisbury St, Worcester, MA 01609	42.2914106	-71.8295141
Clark University	950 Main St, Worcester, MA 01610	42.25002	-71.8233435
College of the Holy Cross	1 College St, Worcester, MA 01610	42.2381278	-71.8108392
MCPHS University	19 Foster St, Worcester, MA 01608	42.2643479	-71.8004724
Quinsigamond Community College	670 W Boylston St, Worcester, MA 01606	42.3151451	-71.7943497
Umass Medical School	55 N Lake Ave, Worcester, MA 01655	42.2777182	-71.7618519
Worcester Polytechnic University	100 Institute Rd, Worcester, MA 01609	42.2739602	-71.8105877
Worcester State University	486 Chandler St, Worcester, MA 01602	42.2676239	-71.8439767

Sources: City of Worcester, MA, "Colleges & Universities," accessed April 24, 2024..; "Contact Us," Assumption University, accessed April 24, 2024.; "Questions? | Clark University Campus Store," accessed April 24, 2024.; "Contact the College of the Holy Cross," College of the Holy Cross, accessed April 24, 2024.; "MCPHS University | Better Business Bureau® Profile," accessed April 24, 2024.; "Quinsigamond Community College - Massachusetts Colleges Online," June 22, 2017.; "Contact Us," UMass Chan Medical School, September 5, 2013.; "Marketing: Contact WPI," Formsite, accessed April 24, 2024.; "Contact Worcester State | Worcester State University," accessed April 24, 2024.

Table 7) 2001 Enrollment at Higher Educational Institutions in Worcester by Race

2001 Enrollment at Higher Educational Institutions in Worcester by Race								
Data Point Unavailable				**Data Unavailable for Year**				
School	Total Enrollment	Asian or Pacific Islander	Black	Indigenous	Hispanic/Latino	Non-Resident Alien	white	Unknown or Unreported
Assumption University	2779	1.04%	0.94%	0.11%	1.87%	1.08%	79.20%	15.76%
Clark University	2955	3.25%	2.91%	0.20%	2.27%	14.25%	59.29%	17.83%
College of the Holy Cross	2811	3.63%	2.95%	0.25%	4.66%	0.75%	77.16%	10.60%
MCPHS University		-	-	-	-	-	-	-
Quinsigamond Community College	6197	4.07%	6.42%	0.65%	9.67%	0.90%	68.44%	9.86%
Umass Medical School	686	7.14%	2.04%	0.15%	2.04%	9.77%	76.53%	2.33%
Worcester Polytechnic University	3835	6.10%	1.27%	0.23%	2.23%	13.65%	74.40%	2.12%
Worcester State University	5768	3.05%	3.69%	0.57%	3.48%	2.20%	80.48%	6.52%
Sources: National Center for Education Statistics. n.d. "IPEDS Data Center." Accessed April 10, 2024.								

Table 8) 2010 Enrollment at Higher Educational Institutions in Worcester by Race

2010 Enrollment at Higher Educational Institutions in Worcester by Race										
Data Point Unavailable					**Data Unavailable for Year**					
School	Total Enrollment	Asian	Black	Indigenous	Hispanic/Latino	Native Hawaiian or Pacific Islander	Non-Resident Alien	Two or More	white	Unknown or Unreported
Assumption University	2764	1.00%	3.00%	0.00%	5.00%	0	1.00%	0.01	74.00%	14.00%
Clark University	3451	3.00%	3.00%	0.00%	4.00%	0	20.00%	0.01	58.00%	10.00%
College of the Holy Cross	2899	5.00%	5.00%	0.00%	9.00%	0	1.00%	0.01	65.00%	14.00%
MCPHS University		24.00%	5.00%	0.00%	2.00%	0	5.00%	0.01	48.00%	14.00%
Quinsigamond Community College	8922	4.00%	10.00%	1.00%	12.00%	0	1.00%	0.01	67.00%	5.00%

Umass Medical School	1158	10.00%	4.00%	0.00%	2.00%	0	13.00%	0	63.00%	8.00%
Worcester Polytechnic University	5360	6.00%	3.00%	0.00%	5.00%	0	15.00%	0	65.00%	6.00%
Worcester State University	5708	3.00%	6.00%	0.00%	6.00%	0	1.00%	0.01	76.00%	7.00%
Sources: National Center for Education Statistics. n.d. "IPEDS Data Center." Accessed April 10, 2024.										

Table 9) 2020 Enrollment at Higher Educational Institutions in Worcester by Race

2020 Enrollment at Higher Educational Institutions in Worcester by Race										
Data Point Unavailable					Data Unavailable for Year					
School	Total Enrollment	Asian	Black	Indigenous	Hispanic/Latino	Native Hawaiian or Pacific Islander	Non-Resident Alien	Two or More	white	Unknown or Unreported
Assumption University	2448	3.00%	5.00%	0.00%	9.00%	0	1.00%	0.03	74.00%	4.00%
Clark University	3405	5.00%	4.00%	0.00%	7.00%	0	26.00%	0.03	51.00%	4.00%
College of the Holy Cross	2970	4.00%	4.00%	0.00%	11.00%	0	3.00%	0.03	72.00%	3.00%
MCPHS University		19.00%	9.00%	0.00%	7.00%	0	13.00%	0.03	40.00%	8.00%
Quinsigamond Community College	6942	5.00%	13.00%	0.00%	21.00%	0	0.00%	0.03	52.00%	5.00%
Umass Medical School	1292	19.00%	6.00%	0.00%	5.00%	0	9.00%	0	57.00%	3.00%
Worcester Polytechnic University	6920	7.00%	3.00%	0.00%	8.00%	0	15.00%	0.03	59.00%	6.00%
Worcester State University	5724	5.00%	8.00%	0.00%	13.00%	0	1.00%	0.03	66.00%	4.00%
Sources: National Center for Education Statistics. n.d. "IPEDS Data Center." Accessed April 10, 2024.										

Table 10) WPI Tuition, Fees, and Admissions Summary by Year

WPI Tuition, Fees, and Admissions Summary by Year							
Data Point Unavailable				Data Unavailable for Year			
Fall Year	Applicants	Admitted	Freshman Enrollment	Total Student Body Size	Tuition and Fees	Books	Tuition and Fees (2022 Dollars)
2023	11809	6908	1357	7353			
2022	11599	6667	1354	7308	$57,096.00	$ 1,200.00	$57,096.00
2021	11092	6679	1410	7230	$55,731.00	$ 1,200.00	$60,191.00
2020	11269	6654	1294	6920	$54,416.00	$ 1,200.00	$61,531.83
2019	10645	5255	1199	6894	$52,320.00	$ 1,000.00	$59,891.61
2018	10584	4402	1278	6874	$50,530.00	$ 1,000.00	$58,890.66
2017	10329	5007	1126	6642	$48,628.00	$ 1,000.00	$58,058.21
2016	10468	5071	1124	6642	$46,994.00	$ 1,000.00	$57,302.62
2015	10172	4938	1093	6573	$45,590.00	$ 1,000.00	$56,291.92
2014	10233	4480	1056	6381	$44,222.00	$ 1,000.00	$54,667.60
2013	8578	4425	1103	6296	$42,778.00	$ 1,000.00	$53,740.37
2012	7585	3986	951	5957	$41,380.00	$ 1,000.00	$52,745.56
2011	7049	3998	1005	5778	$40,030.00	$ 1,000.00	$52,080.70
2010	6660	3933	910	5360	$38,700.00	$ 1,000.00	$51,939.63
2009	6284	3989	925	4979	$37,440.00	$ 1,000.00	$51,070.41
2008	5706	3803	907	4561	$36,390.00	$ 1,000.00	$49,463.85
2007*	5698	3739	805	4157	$34,830.00	$ 1,000.00	$49,161.16
2006	4931	2450	688	3903	$33,318.00	$ 1,000.00	$48,366.46
2005	3315	2822	733	3869	$31,390.00	$ 735.00	$47,037.59
2004	3708	2783	746	3804	$29,730.00	$ 706.00	$46,059.47
2003	3575	2579	631	3785	$28,420.00	$ 692.00	$45,202.47
2002	3191	2436	714	3802	$26,360.00	$ 670.00	$42,881.52
2001	3216	2417	700	3835	$24,890.00	$ 650.00	$41,130.34
2000	3266	2515	689	3833	$23,262.00	$ 630.00	$39,533.92
1999	3244	2562	662	3840	$22,158.00	$ 610.00	$38,923.47
1998	3167	2462	684	3805			
1997	3165	2450	688	3742			
1996	2710	2215	689	3648			
1995	2480	2112	589	3719			
1994	2539	2193	697	3795			
1993	2772	2315	682	3943			
1992	2862	2201	609	3913			
1991	2694	2172	685	3912			
1990	2693	2120	703	3911			

1989	2670	2193	713	3970	
1988	2806	2069	639	3767	
1987	2949	1748	612	3945	
1986	2380	1644	716	4022	
1985	2420	1505	606	4001	
1984				3812	
1980				3484	

Sources: WPI Student Fact Books for FY 1994-2011, 2016; WPI Common Dataset 2012-2013; National Center for Education Statistics. 2001-2022. "WPI Reported Data: Institutional Characteristics." IPEDS Data.

Table 11) WPI Undergraduate Enrollment of Underrepresented Minorities by Year and Source

WPI Undergraduate Enrollment of Underrepresented Minorities by Year and Source					
Data Point Not Available			Data Unavailable for Year		
Fall Year	Enrollment Dashboard	2016 Student Fact Book	2011 Student Fact Book	2006 Student Fact Book	Computed
2023	12.32				10.78
2022	12.71				11.42
2021	12.90				11.93
2020	13.21				11.92
2019	13.15				11.93
2018	13.41				12.40
2017	13.60				12.45
2016	13.29	13.60			12.20
2015	12.19	12.60			
2014	13.20	12.20			
2013		11.80			
2012		11.70			
2011			11.80		
2010			11.00		
2009			10.30		
2008			9.00		
2007			7.60		
2006			7.70		
2005				5.80	4.03
2004				5.70	3.99
2003				5.10	3.80
2002				4.40	3.25

2001		4.20	2.84
2000		4.10	2.74
1999		4.60	2.88
1998		4.70	2.85
1997		4.80	3.07
1996			2.86
1995			2.45
1994			1.76
Sources: See Columns			

Table 12) WPI Graduate Enrollment of Underrepresented Minorities by Year and Source

WPI Graduate Enrollment of Underrepresented Minorities by Year and Source				
Data Point Not Available		**Data Unavailable for Year**		
Fall Year	Enrollment Dashboard	2016 Student Fact Book	2011 Student Fact Book	Computed
2023	8.42			7.47
2022	9.84			9.17
2021	9.87			9.12
2020	10.06			9.17
2019	7.74			6.94
2018	8.30			7.48
2017	7.25			6.30
2016	7.06	6.50		5.82
2015	7.34	7.00		
2014	7.22	5.50		
2013		5.30		
2012		4.30		
2011			4.20	3.47
2010			4.40	4.43
2009			4.90	4.94
2008			4.10	3.58
2007			4.20	2.85
2006			5.00	3.24
2005				2.63
2004				2.55

2003	[redacted]	3.07
2002		2.02
2001		2.17
2000		2.46
1999		3.30
1998		3.04
1997		3.39
1996		2.60
1995		2.12
1994		1.62
Sources: See Columns		

Table 13) WPI's Total Institutionally-Controlled Housing Capacity and Cost of Room & Board by Year

WPI's Total Housing Capacity by Year						
Data not Available				Data Unavailable for Year		
Fall Year	Total Dorm Capacity	Typical Room Charge per Year	Typical Board Charge per Year	Room Charge per Year (2022 Dollars)	Board Charge per Year (2022 Dollars)	Monthly Adjusted Room and Board Charge
2022	2369	$ 9,482.00	$ 7,206.00	$ 9,482.00	$ 7,206.00	$ 1,668.80
2021	2508	$ 9,250.00	$ 7,030.00	$ 9,990.25	$ 7,592.59	$ 1,758.28
2020	2217	$ 8,990.00	$ 6,830.00	$ 10,165.60	$ 7,723.14	$ 1,788.87
2019	2240	$ 8,736.00	$ 6,566.00	$ 10,000.25	$ 7,516.21	$ 1,751.65
2018	2240	$ 8,440.00	$ 6,334.00	$ 9,836.48	$ 7,382.02	$ 1,721.85
2017	2117	$ 8,122.00	$ 6,096.00	$ 9,697.06	$ 7,278.17	$ 1,697.52
2016	2072	$ 7,846.00	$ 5,890.00	$ 9,567.10	$ 7,182.03	$ 1,674.91
2015	2044	$ 7,654.00	$ 5,756.00	$ 9,450.72	$ 7,107.18	$ 1,655.79
2014	2085	$ 7,466.00	$ 5,616.00	$ 9,229.53	$ 6,942.55	$ 1,617.21
2013	1984	$ 7,466.00	$ 5,616.00	$ 9,379.25	$ 7,055.17	$ 1,643.44
2012	1590	$ 7,220.00	$ 5,430.00	$ 9,203.07	$ 6,921.42	$ 1,612.45
2011	1590	$ 6,982.00	$ 4,952.00	$ 9,083.87	$ 6,442.76	$ 1,552.66
2010	1590	$ 6,750.00	$ 4,790.00	$ 9,059.24	$ 6,428.70	$ 1,548.79
2009	1590	$ 6,530.00	$ 4,630.00	$ 8,907.31	$ 6,315.60	$ 1,522.29
2008	1495	$ 6,380.00	$ 4,500.00	$ 8,672.15	$ 6,116.72	$ 1,478.89
2007	1226	$ 6,104.00	$ 5,326.00	$ 8,615.55	$ 7,517.44	$ 1,613.30
2006	1241	$ 5,840.00	$ 5,096.00	$ 8,477.70	$ 7,397.67	$ 1,587.54
2005	1225	$ 5,764.00	$ 4,900.00	$ 8,637.29	$ 7,342.60	$ 1,597.99
2004	1225	$ 5,650.00	$ 4,800.00	$ 8,753.31	$ 7,436.44	$ 1,618.98
2003	1225	$ 5,184.00	$ 4,030.00	$ 8,245.24	$ 6,409.78	$ 1,465.50
2002	1225	$ 4,890.00	$ 3,836.00	$ 7,954.88	$ 6,240.27	$ 1,419.52
2001	1225	$ 4,530.00	$ 3,370.00	$ 7,485.75	$ 5,568.87	$ 1,305.46
2000	1800	$ 4,116.00	$ 3,476.00	$ 6,995.17	$ 5,907.48	$ 1,290.27
1999	1225	$ 3,600.00	$ 3,310.00	$ 6,323.88	$ 5,814.45	$ 1,213.83
1998	1225	$ 3,428.00	$ 3,150.00	$ 6,154.73	$ 5,655.60	$ 1,181.03
1997	1229	$ 3,234.00	$ 3,004.00	$ 5,896.86	$ 5,477.48	$ 1,137.43
1996	1229	$ 3,080.00	$ 2,860.00	$ 5,744.92	$ 5,334.57	$ 1,107.95
1995		$ 2,932.00	$ 2,720.00	$ 5,630.34	$ 5,223.24	$ 1,085.36
1994	1264	$ 2,790.00	$ 2,590.00	$ 5,509.50	$ 5,114.55	$ 1,062.40
1993	1264	$ 2,650.00	$ 2,456.00	$ 5,367.03	$ 4,974.12	$ 1,034.12
1992	1264	$ 2,540.00	$ 2,340.00	$ 5,298.24	$ 4,881.06	$ 1,017.93
1991	1264	$ 2,370.00	$ 2,230.00	$ 5,092.45	$ 4,791.63	$ 988.41
1990	1264	$ 2,370.00	$ 2,230.00	$ 5,306.75	$ 4,993.27	$ 1,030.00
1989	1196	$ 2,190.00	$ 2,120.00	$ 5,168.66	$ 5,003.46	$ 1,017.21
1988	1196	$ 2,050.00	$ 2,025.00	$ 5,071.37	$ 5,009.52	$ 1,008.09
1987	1200	$ 2,050.00	$ 1,845.00	$ 5,281.19	$ 4,753.07	$ 1,003.43

Sources: National Center for Education Statistics. n.d. "IPEDS Data Center." Accessed April 10, 2024.

Table 14) 2000 Spatial Lag vs Ordinary Least Squares

2000 Model Comparison				
Model	**Coefficient**	**Parameter Estimate**	**Standard Error**	**p-value**
Standard Model 2010	Intercept	0.162007	0.009636	2.00E-16
	Proximity to Clark	0.024363	0.007005	5.18E-04
	Proximity to WPI	0.014369	0.008831	0.103914
	Residual standard error: 0.2349 on 1726 degrees of freedom			
	Multiple R-squared: 0.009187, Adjusted R-squared: 0.008039			
	F-statistic: 8.002 on 2 and 1726 DF, p-value: 0.0003475			
Spatially Lagged Model 2010	Intercept	0.1123077	0.0110103	2.00E-16
	Proximity to Clark	0.0155543	0.0068082	0.02233
	Proximity to WPI	0.0085991	0.0085481	3.14E-01
	Rho: 0.079919, LR test value: 4.1948, p-value: 0.040549			
	Asymptotic standard error: 0.039061 z-value: 2.046, p-value: 0.040757			
	Wald statistic: 4.1861, p-value: 0.040757			

Table 15) 2010 Spatial Lag vs Ordinary Least Squares

2010 Model Comparison				
Model	**Coefficient**	**Parameter Estimate**	**Standard Error**	**p-value**
Standard Model 2010	Intercept	0.153917	0.011351	2.00E-16
	Proximity to Clark	0.058638	0.009205	2.35E-10
	Proximity to WPI	0.022431	0.008714	0.0101
	Residual standard error: 0.3233 on 1962 degrees of freedom			
	Multiple R-squared: 0.02482, Adjusted R-squared: 0.02383			
	F-statistic: 24.97 on 2 and 1962 DF, p-value: 1.954e-11			
Spatially Lagged Model 2010	Intercept	0.1279402	0.0126768	2.20E-16
	Proximity to Clark	0.0172063	0.008663	0.04701
	Proximity to WPI	0.0535784	0.0093554	1.02E-08
	Rho: 0.15525, LR test value: 19.165, p-value: 1.1992e-05			
	Asymptotic standard error: 0.036132 z-value: 4.2968, p-value: 1.7332e-05			
	Wald statistic: 18.462, p-value: 1.7332e-05			

Table 16) 2020 Spatial Lag vs Ordinary Least Squares

2020 Model Comparison				
Model	**Coefficient**	**Parameter Estimate**	**Standard Error**	**p-value**
Standard Model 2020	Intercept	0.2869	0.01493	2.00E-16
	Proximity to Clark	0.02726	0.01032	8.31E-03
	Proximity to WPI	0.03301	0.01245	0.00809
	Residual standard error: 0.3954 on 1803 degrees of freedom			
	Multiple R-squared: 0.008274, Adjusted R-squared: 0.007174			
	F-statistic: 7.521 on 2 and 1803 DF, p-value: 0.0005586			
Spatially Lagged Model 2020	Intercept	0.265092	0.018768	2.00E-16
	Proximity to Clark	0.03021	0.012469	0.0154
	Proximity to WPI	0.025183	0.010341	1.49E-02
	Rho: 0.076709, LR test value: 3.8507, p-value: 0.049725			
	Asymptotic standard error: 0.039111 z-value: 1.9613, p-value: 0.04984			
	Wald statistic: 3.8468, p-value: 0.04984			

6 References

"About Accreditation | Council for Higher Education Accreditation." Accessed April 22, 2024.

Aisch, Gregor, Larry Buchanan, Amanda Cox, and Kevin Quealy. "Economic Diversity and Student Outcomes at Worcester Polytechnic Institute." *The New York Times*, January 18, 2017, sec. The Upshot.

"An Older African American Neighborhood: John, Lily, North Ashland, & Bowdoin Streets." Worcester, MA: Holy Cross University. Accessed April 17, 2024.

Andrews, Nikki. 1998. "1998 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 1999. "1999 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2000. "2000 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2001. "2001 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2002. "2002 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2003. "2003 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2004. "2004 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 2005. "2005 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

Apelian, Diran, Peter H. Horstmann, William R. Grogan, Robert R. Gailey, Raymond. R Hagglund, Albert Sacco Jr., Helen G. Vassallo, et al. "Report of the Blue Ribbon Task Force: 'Positioning WPI for the 21st Century.'" Worcester, MA: Worcester Polytechnic Institute, May 21, 1993. UA03: Provost and Vice President for Academic Affairs records, UA03.02.02, Box 3. WPI University Archives.

Assumption University. "Contact Us." Accessed April 24, 2024.

Atkinson, Rowland, and Gary Bridge, eds. *Gentrification in a Global Context: The New Urban Colonialism*. London: Routledge, 2004.

Baloy, Natalie J.K. "Spectacles and Spectres: Settler Colonial Spaces in Vancouver." *Settler Colonial Studies* 6, no. 3 (July 2, 2016): 209–34.

Berkey, Dennis, Laura Gordon Fisher, Michael A. Flushe, Thomas Michalak, Martha Mathis, John Palmucci, Susan Prager, and Chittaranjan Sahay. "Report to the Faculty, Administration, Trustees, and Students of Worcester Polytechnic Institute, Worcester, Massachusetts." Worcester, MA: New England Association of Schools and Colleges, 2001.

Blinn, Kari E. 1994. "1994 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 1995. "1995 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 1996. "1996 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

———. 1997. "1997 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.

Bose, Sayoni. "Universities and the Redevelopment Politics of the Neoliberal City." *Urban Studies* 52, no. 14 (November 1, 2015): 2616–32.
Burshan, Naya. "A Welfare Analysis of Gentrification in Worcester, Massachusetts." Amherst College, April 20, 2022.
City of Worcester, MA. "Colleges & Universities." Accessed April 24, 2024.
City of Worcester, MA. "Property Records | City of Worcester, MA," 2024.
College of the Holy Cross. "Contact the College of the Holy Cross." Accessed April 24, 2024.
Darren P. Smith, Darren P. Smith, Phil Hubbard, Phil Hubbard, and Philip Hubbard. "The Segregation of Educated Youth and Dynamic Geographies of Studentification." *Area* 46, no. 1 (March 1, 2014): 92–100.
Division of Enrollment Management. 2008. "2008 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. 2009. "2009 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. 2010. "2010 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. 2011. "2011 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. 2016. "2016 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. n.d. "Common Data Set 2012-2013." Worcester, MA: Worcester Polytechnic Institute. Accessed April 18, 2024.
Econsult Solutions, Inc. "New England Colleges and Universities Are Facing a Diversity Problem. Here's Why It Matters." *Econsult Solutions, Inc.* (blog), December 13, 2019.
Ellis-Young, Margaret. "Gentrification as (Settler) Colonialism? Moving beyond Metaphorical Linkages." *Geography Compass* 16, no. 1 (2022): e12604.
Foss, Sonja K. *Rhetorical Criticism: Exploration and Practice*. 5th ed. Long Grove, Illinois: Waveland Press, Inc., 2018.
Gordon, Judith R. "Judith R. Gordon to Dr. Dennis D. Berkey on Behalf of the New England Association of Schools & Colleges, Inc.," November 8, 2006.
Greenwood, Janette Thomas. *First Fruits of Freedom: The Migration of Former Slaves and Their Search for Equality in Worcester, Massachusetts, 1862-1900*. Chapel Hill, NC: The University of North Carolina Press, 2009.
———. "Janette Thomas Greenwood: Acknowledging Racism in Worcester's Industrial Past." The Worcester Telegram & Gazette. Accessed April 28, 2024.
Gregory, Derek, Ron Johnston, Geraldine Pratt, Michael J. Watts, and Sarah Whatmore. *The Dictionary of Human Geography*. 5th ed. Blackwell Publishing Ltd, 2009.
Gross, Daniel T. "Studentification, Racial Inequity, and Rust Belt Revitalization: A 'Longitudinal' Exploration of the Demographic Impacts of Studentification in the City of Binghamton and the Village of Johnson City, NY (2000 – 2023)." M.A., State University of New York at Binghamton, 2023.
Hassanamisco Indian Museum. "History - Hassanamisco Indian Museum," 2023.
Hauff, Gray. "Examining WPI's Connection to Indigenous Dispossession in the United States." Worcester, MA: Worcester Polytechnic Institute, March 31, 2023.
"How Can I Calculate Moran's I in R? | R FAQ." Accessed April 22, 2024.
"How Spatial Autocorrelation (Global Moran's I) Works—ArcGIS Pro | Documentation." Accessed April 22, 2024.

Hynick, Jack. "Indians in the Archives: A History of Native Americans, Pakachoag Hill and Holy Cross, 1674-1973" 3, no. Article 9 (May 2022).
Ilano, Lauren. "Urban Universities on Contested Terrain: Racial Academic Capitalism, Gentrification, and the Politics of Expansion." UCLA, 2020.
Kauanui, J. Kēhaulani. "'A Structure, Not an Event': Settler Colonialism and Enduring Indigeneity." *Lateral* 5, no. 1 (2016).
Kirsch, Taylor. "Indigenous Land Ownership in 17th Century Mission Communities: A Survival Story from Southern New England." University of California, Santa Cruz, 2021.
Mahoney, Kathryn, and Jacqui McEttrick. "Homes and Housing Patterns of People of Color in Worcester in 1888." Worcester and Its People. Accessed April 17, 2024.
"MCPHS University | Better Business Bureau® Profile." Accessed April 24, 2024.
Moos, Markus, Nick Revington, Tristan Wilkin, and Jean Andrey. "The Knowledge Economy City: Gentrification, Studentification and Youthification, and Their Connections to Universities." *Urban Studies* 56, no. 6 (May 1, 2019): 1075–92.
Mora, Ricardo, and Javier Ruiz-Castillo. "Entropy-Based Segregation Indices." *Sociological Methodology* 41, no. 1 (August 1, 2011): 159–94.
Munsun, David C., Alexis Abramson, Natalia F. Blank, Marin Clarkberg, Kim Godsoe, Coleen C. Pantalone, Christie L. Taylor, and James Walsh. "Report to the Faculty, Administration, Trustees, Students of Worcester Polytechnic Institute." New England Commission of Higher Education, 2022.
Napierala, Jeffrey, and Nancy Denton. "Measuring Residential Segregation With the ACS: How the Margin of Error Affects the Dissimilarity Index." *Demography* 54, no. 1 (February 2017): 285–309.
National Center for Education Statistics. "IPEDS." Accessed April 22, 2024.
———--. 2001-2022. "WPI Reported Data: Institutional Characteristics." IPEDS Data.
———. 2022. "WPI Reported Data: Financial Aid and Net Price." IPEDS Data.
———. n.d. "IPEDS Data Center." Accessed April 10, 2024.
National Institute of Standards and Technology. "4.4.5.3. Accounting for Errors with a Non-Normal Distribution." Accessed April 23, 2024.
Nau, Robert. "Introduction to ARIMA Models." Accessed April 24, 2024.
———. "Stationarity and Differencing of Time Series Data." Accessed April 23, 2024.
New England Commission Higher Education. "Becoming Accredited." Accessed April 22, 2024.
"New Ideas, New Vision, New Resources: An Ambitious Plan to Raise the University to New Levels of Quality and Prestige; FY2000 to FY2010." Worcester, MA: Worcester Polytechnic Institute, May 1999. UA03: Provost and Vice President for Academic Affairs records, UA03.02.02, Box 4. WPI University Archives.
Office of Enrollment Management. 2006. "2006 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
———. 2007. "2007 Student Fact Book." Periodic. Student Fact Books. Worcester, MA: Worcester Polytechnic Institute.
Office of Strategic Initiatives and University Analytics. "Enrollment Dashboard | Worcester Polytechnic Institute." Worcester Polytechnic Institute, October 2023.
Office of the President. "Lead With Purpose: WPI's Strategic Plan, 2021-2026." Worcester, MA: Worcester Polytechnic Institute, November 19, 2021.
Office of the Under Secretary. "Strategies For Increasing Diversity and Opportunity in Higher Education." U.S. Department of Education, September 2023.
Pattenaude, Richard L. "Mr. Richard L. Pattenaude to Dr. Dennis D. Berkey on Belalf of the New England Association of Schools & Colleges, Inc.," November 15, 2012.

"Questions? | Clark University Campus Store." Accessed April 24, 2024.
Quigley, David. "David Quigley to Dr. Laurie A. Leshin on Behalf of the New England Association of Schools & Colleges, Inc.," January 12, 2017.
"Quinsigamond Community College - Massachusetts Colleges Online," June 22, 2017.
Real Statistics Using Excel. "Newey-West Standard Errors." Accessed April 23, 2024.
Revington, Nick, Austin Zwick, Maxwell Hartt, and Jack Schlosser. "Universities and Urban Social Structure: Gentrification, Studentification, and Youthification in Five United States Legacy Cities." *Urban Geography* 44, no. 1 (January 2, 2023): 83–104.
Ricciardi, Daniel. "Census Data of Worcester's People of Color in the 1850s." Worcester and Its People. Accessed April 17, 2024.
Smith, Darren P. "'Studentification Ication': The Gentrification Factory?" In *Gentrification in a Global Context: The New Urban Colonialism*, edited by Rowland Atkinson and Gary Bridge, 73–90. London: Routledge, 2004.
Smith, Neil. "Gentrification and the Rent Gap." *Annals of the Association of American Geographers* 77, no. 3 (September 1, 1987): 462–65.
———. "Toward a Theory of Gentrification A Back to the City Movement by Capital, Not People." *Journal of the American Planning Association* 45, no. 4 (October 1, 1979): 538–48.
Snelgrove, Corey, Rita Dhamoon, and Jeff Corntassel. "Unsettling Settler Colonialism: The Discourse and Politics of Settlers, and Solidarity with Indigenous Nations." *Decolonization: Indigeneity, Education & Society* 3, no. 2 (September 29, 2014).
Staff, Laura Krantz Globe, April 24, 2015, and 11:57 p m Share on Facebook Share on TwitterView Comments144. "Diverse Campuses, but Still Few Black Students - The Boston Globe." BostonGlobe.com. Accessed April 21, 2024.
Tuck, Eve, and K Wayne Yang. "Decolonization Is Not a Metaphor." *Decolonization: Indigeneity, Education & Society* 1, no. 2 (2012): 1–40.
UMass Chan Medical School. "Contact Us," September 5, 2013.
US Census Bureau. "About the American Community Survey." Census.gov. Accessed April 22, 2024.
———. "Census Bureau Estimates Show Average One-Way Travel Time to Work Rises to All-Time High." Census.gov. Accessed March 20, 2024.
———. "Decennial Census of Population and Housing by Decades." Census.gov. Accessed January 23, 2024.
———. "Financial Characteristics." U.S. Census Bureau, 2022.
———. "Glossary." Census.gov. Accessed April 22, 2024.
———. "Mean Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1902, 2010-2019. Accessed on May 1, 2024.
———. "Mean Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)." American Community Survey, ACS 1-Year Estimates Subject Tables, Table S1902, 2021-2022. Accessed on May 1, 2024.
———. "Median Contract Rent (Dollars)." U.S. Census Bureau, 2022.
———. "Selected Housing Characteristics." U.S. Census Bureau, 2022.
———. "What Are Census Blocks?" Census.gov. Accessed April 22, 2024.
U.S. Department of the Treasury. "Post 5: Racial Differences in Educational Experiences and Attainment," March 19, 2024.
Veracini, Lorenzo. *Settler Colonialism: A Theoretical Overview*. Hardback Edition. New York NY USA: Palgrave Macmillan, 2010.

Vigdor, Jacob L. "Does Gentrification Harm the Poor?" *Brookings-Wharton Papers on Urban Affairs* 2002, no. 1 (2002): 133–82.
Waánataŋ, Wakíŋyaŋ. "Jul 29, 2017 - Gentrification Is NOT the New Colonialism." Last Real Indians, July 29, 2017.
Walker, Kyle E. *Chapter 8 Modeling US Census Data | Analyzing US Census Data*. CRC Press, 2023.
"Welcome to Nipmuc Nation." Accessed April 17, 2024.
Wolfe, Patrick. "Settler Colonialism and the Elimination of the Native." *Journal of Genocide Research* 8, no. 4 (December 1, 2006): 387–409.
Worcester Historical Museum. "Industrialization." Accessed April 28, 2024.
Worcester Polytechnic Institute. "Guides: Land & Labor Acknowledgements: Home." Accessed April 17, 2024.
———. "Living On Campus." Accessed April 12, 2024.
———. "Marketing: Contact WPI." Accessed April 24, 2024.
Worcester Regional Chamber of Commerce. "Doing Business in Worcester." Accessed April 28, 2024.
Worcester State University. "Contact Worcester State." Accessed April 24, 2024.
WPI Alumni. "To President Laurie Leshin from WPI Alumni," June 8, 2020.
"WPI Alumni Against Racism." Powerpoint, June 6, 2020.
"WPI Alumni Racial Justice | Worcester Polytechnic Institute." Accessed April 17, 2024.
Zarrella, Ronald L. "Mr. Ronald L. Zarrella to Dr. Edward Alton Parrish on Behalf of the New England Association of Schools & Colleges, Inc.," May 6, 2002.