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Constantly on the move Chinese engineers' job-hopping strategies in information technology work

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Abstract

This article examines Chinese immigrant engineers' navigation in the highly flexible information technology (IT) industry in the United States and their strategies of utilizing the high-velocity labour market to their advantage. Flexible employment has grown both in prevalence and prominence in the study of the American IT industry. What flexibility theorists fail to attend to, however, is the ethnicised demission of the high-velocity labour market in the IT sector. To address this vacancy, the researcher conducted a 13-month ethnography at a leading internet-services firm in the United States and 66 additional interviews with engineers from eight leading tech companies. The ethnographic work showed that inequality that emerged within the tech firms (e.g. 'bamboo ceilings') disadvantaged Chinese engineers' career development. The 'bamboo ceiling' stimulated Chinese immigrants to use the high-velocity labour market to normalize their job-hopping practices, in order to circumvent their career disadvantage. To facilitate their job-hopping, Chinese engineers developed university-based networks. This study concludes that, with help of their university network, Chinese immigrants became the most mobile group in the US tech industry, which further preserved the industry's flexibility.

JELcodes: D23, L16

Keywords

Engineers, inequality, Asian immigrants, flexibility, cohort circle, high-tech

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Introduction

There is a growing consensus, in academic analysis and popular readings, that first-generation Asian immigrants are Silicon Valley's best 'secret weapon' (Kaku, cited by Jones, 2016; Saxenian, 2001; Saxenian, 2002). Statistically speaking, first-generation Asian engineers have become the majority in the United States (US) high-tech industry (EEOC [Equal Employment Opportunity Commission], 2016).[1] The percentage of Silicon Valley's tech workforce who are of Asian origin grew from 39% in 2000 to more than 50% by the 2010 Census, and subsequent analyses of EEOC data indicate further increase by 2018 (Kim et al., 2020; Scott et al., 2018).[2]

Owing to the growing representation of Asian immigrants in the US tech industry, investigating Asian engineers' experience in technology work has gained attention from many academic fields, such as labour studies, ethnicity and migration scholarship, and organisational analysis. In labour analysis, the study of Asian immigrants' experience in tech work can be roughly divided into two approaches. The first perceives labour relations from inter-organisational perspectives and focuses on Asian immigrant engineers' navigation of the labour market (Tang, 1993; Saxenian, 2000; Savinar, 2019). The second focuses on how intra-organisational processes shape labour practice, and investigates Asian immigrant engineers' work experience within specific technology firms (Ontiveros, 2017; Scott et al., 2018).

The first approach follows an earlier tradition of flexibility scholarship (Smith and Neuwirth, 2008) and contextualises Asian engineers' experiences as demonstrating one essential characteristic of the American information technology (IT) industry: its high-velocity labour market, which allows tech companies to adjust their workforce sizes and skills quickly to react to market fluctuations (Barley and Kunda, 2004; Xiang, 2007). Asian engineers are seen as integrating well with the high-tech industry's high flexibility, with constant job-hopping as a norm among Asian immigrants (Hyde, 2003; Saxenian, 2000). What this approach fails to reflect, however, is why these Asian immigrants are constantly on the move. Without articulating the factors that motivate Asian engineers' high mobility, it is impossible to develop a full picture of their navigation of the high-velocity tech labour market.

The second approach documents Asian engineers' experiences within the workplace. The consensus here is that Asian engineers inevitably encounter a 'bamboo ceiling'.[3] To illustrate this problem, quantitative scholars show that Asian workers are severely underrepresented in managerial positions and have lower ratings in promotability at tech, despite their overrepresentation in the tech labour force and high ratings for technical skills (Kim et al., 2020; Peck and Wong, 2015; Tang, 1993). Qualitative investigations, conversely, follow the classic approach of organisational analysis and examine the mechanisms that channel Asian engineers into lower rungs of tech firms (Alarcon, 1999; Savinar, 2019).

This depiction of Asian immigrants' disadvantages is too determinative and leaves no space to probe the agency of engineers. The present study is more nuanced and examines if there is any possibility that Asian engineers can mobilise self-agency to reverse disadvantages within tech firms. It attempts to bridge the two approaches to studying

Asian immigrants and explores the potential connections between Asians' coping with a highly flexible labour market and their navigation of the 'bamboo ceiling' within tech organisations. By presenting such interactions, it offers a new approach to explaining Asian immigrants' practice in the tech industry.

The study concentrates on Chinese engineers' navigation of working experiences in the US tech industry. The researcher conducted a 13-month ethnographic study based at Huli (pseudonym), a leading US internet-services firm, and 66 additional interviews with engineers from eight leading tech companies (e.g. 'M Company', 'G Company', 'F Company' and 'T Company'). Chinese immigrant engineers were found to take advantage of the high-velocity labour market to normalise job-hopping and circumvent 'bamboo ceilings' within tech firms. To facilitate their job-hopping, they draw on their privileged educational background. Specifically, Chinese engineers actively construct elite university-based 'cohort circles' and transform them into exclusive culture capital, ensuring their advantaged job placement in top tech companies.

In highlighting the relationship between Chinese engineers' job-hopping strategies and the highly fluid labour market, an ethnicised dimension needs to be integrated into flexible employment theory. The present study reinforces previous accounts of organisational inequality by giving appropriate weight to the agency of ethnic minority groups in reversing disadvantages. Finally, in highlighting the significance of university-based cohorts in facilitating Chinese's job-hopping, it further develops sociological theories of migration. It builds on classic studies of immigrant networks, by showing that it is not only kinship or familial networks that play a vital role in facilitating immigrant job-seeking. For highly skilled Chinese immigrants, university-based cohort circles become the most crucial advantage for enhancing job-searching performance.

Flexible employment, job-seeking and social networking

In a society where 'flexible employment' is now widespread, influenced by neoliberalism, employers rely on the continually updating of skills provided by workers with a high velocity of mobility in order to flexibly respond to the uncertainty of market trends (Cappelli and Keller, 2013; Hyde, 1997). Silicon Valley's critical regional advantage is its flexibility in adjusting the size and skillset of its workforce (Barley and Kunda, 2004; Sharone, 2013).

Under flexible employment regimes, job-seeking has become a permanent form of work. For example, from a cultural perspective, Smith and Neuwirth (2008) identify how temporary work has been constructed as 'good work' suitable for the best young people who are willing to continually hop to different workplaces and accept new challenges. Similarly, Barley and Kunda (2004) note that responsibility for designing career trajectories is now placed on contractors themselves, who must continually invest in accumulating human and social capital to enhance their job-hopping performance.

Sharone (2013) and Lane (2011) focus on the embedding of individual workers' job-searching strategies in the institutional and cultural context. They both illustrate how tech workers internalise the norm of flexible employment and express a highly individualistic job-seeking responsibility. Specifically, Sharone (2013) analyses how American

individualism directs job-seekers to concentrate their job-search strategies on self-presentation, establishing a personal connection with particular employers. Lane's (2011) analysis of tech workers in Dallas shows that, despite constant experiences of job loss, switching and search, tech workers remain steadfast in their belief in flexible employment, perceiving themselves as entrepreneurial agents, responsible for engaging in the constant labour of job-searching, social networking, marketing, managing and professional image improvement.

Existing studies thus underscore the constant labour of job-seeking as the inevitable consequence of the promotion of flexible employment and examine how neoliberal ideology works with flexible employment to direct job-seeking practices (e.g. Gershon, 2017). Despite many studies of on job-seeking in flexible labour markets, there remain several profound issues still not adequately addressed. First, while most current literature successfully links macro-level structural narrative with individual micro-level job-seeking practices, the meso-level narrative is mostly missing from the story; specifically, whether and how dynamics within work organisations may promote constant job-seeking. Therefore, this study attempts to identify factors at the organisational level affecting workers' job-seeking motivation and experiences, thereby contributing a meso-level analysis of why workers are frequently on the move. Secondly, it attempts to add a new ethnic dimension to the discussion of job-seeking under a flexible employment regime. It thereby reveals how this structural condition of flexible employment brings new dynamics, possibilities and consequences to job-seeking experiences among ethnic minority groups.

Network, education and job-seeking in ethnic and migration studies

Social ties are thought to play a critical role in determining applicants' job-seeking behaviour. There are long-standing debates over whether strong or weak social ties matter more; whether job-seekers prioritise professional or personal ties; and whether and how the presence, content and status of social connections matter (Granovetter, 1995). Immigrants' social networks have long been thought to play a vital role in assisting immigrants' settlement and integration, including landing a job in the receiving society (Fernandez and Fernandez-Mateo, 2006). Nevertheless, social network discussion amongst migration scholars is predominantly concentrated on limited types of networks – the kinship network, the familial network, and the immigrant community-based network. This tradition derives from the classic migration study by Massey (1987). Although Menjivar's (1994) empirical study showed a weakening role of kinship-based networks, an alternative has not really been established. Community-based and kinship-based networks were still seen as effectively providing newcomers with information on job opportunities or pointing them to potential labour market niches. Hagan (1998) early identified how such network relationships may operate for male but not female immigrants.

As immigration has become more complicated in the US, however, it has become too simplistic to concentrate only on immigrants' use of kinship or familial networks to

minimise job-seeking risks. This is especially true for Chinese student immigrants. Ethnic enclaves are not the first stop for these immigrants when they first arrive in the receiving country, with the result that the formation of kinship networks loses its spatial foundation. Instead, universities become a much more important social space for these student immigrants. It is plausible therefore, to infer that educational networks formed in higher education play a more critical role in these highly skilled immigrants' future job-landing.

There is little migration literature addressing how the educational network plays a role in assisting immigrants' job-seeking (but see Shih 2006, 2007). Migration scholars tend to accept the standard view of education as the embodiment of human capital (Di Maria and Lazarova, 2012). Literature in this vein has demonstrated the positive relationship between education and occupational status (Breen and Jonsson, 2005). A majority of the relevant research uses a quantitative approach to demonstrate education's effect on employment. Therefore, educational credentials are more likely to be rigidly measured in years of schooling and levels of degrees obtained.

Nevertheless, qualitative researchers have explored alternative mechanisms through which education can affect labour market sorting. Rivera (2011), for example, conducted ethnographic research illustrating that, especially for elite employers, it was the prestige of the educational institutions that affected employers' evaluation of job candidates, but not the length or content of education. Rivera's work is of great significance, as it seeks to interpret elite educational status as a type of cultural capital. Although Asian highly skilled professionals, as an immigrant group, are more likely to graduate from elite universities, Rivera's approach has so far had limited impact in upfronting the cultural advantage of Asian immigrants' elite university backgrounds. This study builds on Rivera's perspective and extends it to investigate how Chinese immigrant engineers draw on their privileged educational background to facilitate their job-seeking practices.

Migration scholars' interpretation of education's role in immigrants' job-sorting overlaps with labour market scholars' focus on human and cultural capital. This is especially true for migration scholars who concentrate on Asian immigrants. Xiang (2007) and Ong (1999) have pointed out that the cultural capital embodied by prestigious educational institutions can be effectively converted to other types of capital, reinforcing stratification. Lee and Zhou (2015) analyse the function of educational institutions in a more nuanced way. They illustrate how schools function as 'gateway institutions', effectively providing intuitional and cultural capital to Asian Americans (Lee and Zhou, 2015).

Nevertheless, migration scholars have not explored universities' role in structuring an ethnicised labour market. To address this issue, the present study focuses on Chinese highly skilled immigrants, attending to how they fashion educational networks and how such networks help their job-seeking. It argues that such an approach is meaningful at three levels. First, it provides migration scholars with insight into a type of network beyond kinship and community network – the educational network – and its role in shaping immigrants' job-landing. Second, it challenges a deep-rooted assumption in ethnicity scholarship that ethnic and immigrant networks are more limited than the networks of Caucasian employees and thereby limit immigrants' access to job opportunities. This study explores whether or not Chinese immigrants may possess a greater

advantage than their white counterparts in drawing on their privileged educational networks to facilitate job-seeking. Finally, it also helps add an ethnicised dimension to scholarship focused on the relationship between the flexible tech labour market and network formation. Investigating highly skilled immigrants' educational networks provides critical insights into how these ethnicised networks facilitate Chinese migrants' job-seeking and potentially affect their mobility in the flexible labour market.

Data and methods

Setting

The researcher anchored her ethnographic work at Huli (pseudonym), a multinational corporation with about 100,000 employees and a market capitalisation of about US$250 billion. It operates an E-Commerce website, develops hardware products and provides infrastructure services (e.g. 'cloud' access) for other companies. Huli has a reputation as one of the world's most influential and innovative high-tech companies. As is common in the technology industry, its employees skew young, with an average age of just 31 years old.

The field setting was the security department under the E-Commerce Group (ECG), consisting of roughly 600 employees and a 'level 8' manager, Josh (all personal names are pseudonyms). ECG is divided into three technical subgroups, or in Huli-speak, 'organisations'. These organisations are charged with developing specific security products, putting them on the company's e-commerce platform, and allowing other Huli developers to use their products through the platform.

This study focused on one ECG organisation, Pipe Org, consisting of about 60 people working on four major projects. The manager of Pipe Org was Jonathan, a 'level seven' manager. Each of the four projects in the Pipe Org had an associated team: The Wizard team, the Knight team, the Assassin team and the Ranger team. Each team had a 'level five' team manager, who supervised 15 software engineers and reported to a 'level six' manager. The engineers had their own engineering level system. For example, the majority of the engineers in the teams were first-level engineers (SD1), which equalised as level four employees in the administrative system. Above SDE I are the level five employees who were always project owners or tech leads. In general, the Pipe Org consisted of 47 engineers and eight managers in total. Among these engineers, 31 were 'white', and 16 self-identified as ethnic minority groups, including Chinese, Indian, Pakistani, Mexican and Vietnamese. Six of the Pipe Org engineers were female. Among these female engineers, three were 'white', two self-identified as Chinese and one came from Bulgaria. Junior engineers (Level four) were the majority of Pipe Org and occupied 64% of the total engineering population.

Participant observation and semi-structured interviews

The author spent 13 months at Huli engaged in interviews and observation, divided into four phases. The initial trip (November 2013–January 2014) served to develop a rapport

with Huli employees and broaden access for subsequent ethnographic work. Ultimately, relationships developed with two Pipe Org organisation members led to a focus on this group. The author also completed 11 formal interviews during this first phase. During the first phase of research, the marginalisation of Chinese engineers at Pipe Org emerged as an essential theme.

In the second phase, the author spent six months (June 2014–December 2014, except for July 2014) in the Pipe Org organisation to observe engineers' daily activities. With the vital help of two key informants, my presence became legitimate in the Wizard team under Pipe Org. I occupied an otherwise empty desk in the corner of the Wizard team area and took detailed notes on what I saw and heard. Observations typically consisted of having lunch with engineers, staying until the mid-afternoon or arriving in the work area in the late afternoon and staying into the evening.

During this second phase, the author was able to witness several key events (e.g. re-organisation of Pipe Org; elimination of core software products; sudden introduction of an outside level-six manager). Moreover, I discerned how these organisational turbulences disadvantaged Chinese engineers mainly and forced a majority of them to leave Pipe Org and hop to other companies. Chinese engineers' collective job-hopping made the author wonder whether job-hopping had become an important way for this group to resist career turbulence.

The author also conducted 27 formal, semi-structured interviews in the second phase. Observation and interviews served complementary roles: observation enabled assessment of how Chinese immigrants were marginalised at Pipe Org and victimised in a series of organisational distrubances; interviews enabled access to Chinese engineers' interpretations of their disadvantaged positions at Pipe Org and their narratives of how they develop strategies (e.g. job-hopping, change of teams and bargaining stock options) to navigate such disadvantages.

The author returned to the field for two months during the summer of 2015. This visit provided an opportunity to probe specific themes and questions emerging from her ongoing data analysis. In the meantime, the author visited with additional teams outside the Pipe Org with entirely different technological foci (e.g. the web design team, the cloud computing organisation and the payment solution department) and conducted eight interviews. The final trip was in 2019, which allowed the researcher to conduct 20 more interviews. This final phase enabled the author to explore whether themes that emerged from Huli (e.g. Chinese immigrants' disadvantaged position and their job-hopping strategies) might apply to other companies such as 'M Company', 'F Company', 'GR Company', 'TA Company' and 'O Company'. Indeed, extending the fieldwork outside Huli provided the author with a more comprehensive picture of job-hopping patterns.

In sum, this study's data consists of several hundred pages of field notes and supplementary materials, including internal memos/documents, brochures and information copied from key informants' 'F Company' pages, as well as notes from informal conversations with informants. The formal interviewees, in sum, include 19 engineers and managers from Pipe Org, 27 engineers from other teams at Huli and 20 Chinese engineers from other tech companies. Among all 66 interviewees, 47 self-identified as Chinese, and the remainder self-identified with other ethnic groups, including White, Indian, Pakistani,

Korean and Vietnamese. Fifty-three of the interviewees were male, and 13 of them were female. The interviewees ranged from 22 to 38 years old (averaging 27) and had worked at companies such as Huli, 'G Company', 'M Company', 'F Company', 'L Company', 'GR Company', 'TA Company' and 'O Company'. The length of their work at the current company was between 3 months and 6 years (averaging 1.5 years).

Data analysis

My coding process began by identifying each passage within my field notes and interview transcripts that referenced career disadvantages, such as unfair task assignments, exclusion from managers' circles, vulnerable and unstable migrant status. Job-hopping became a code most frequently associated with participants' narratives of career disadvantage. I did not set out to analyse job-hopping when I began the project. I originally intended to study Chinese engineers' ethnicised position in high-tech. After the initial coding rounds, however, it became clear that job-hopping was highly salient as a strategy to navigate career disadvantages.

I therefore developed more nuanced codes to capture the concept of job-hopping. For example, I coded each instance for job-hopping, noting specific job hoppers' immigrant status and educational background; their roles in the team. I also coded circumstances under which they decided to hop, key events before and after they hopped, how they obtained job information and with whom they discussed their job-hopping strategies. Then I engaged in further coding and compared different hopping experiences. Several themes emerged from this round of coding. For example, rather than sharing job-hopping experiences with former colleagues or acquittance from a wide social network (e.g. alumni, professional association and social media), informants were more likely to share hopping experiences with university-based cohort circles. I then returned to the coded job-hopping incidences and paid particular but not exclusive attention to mentions of cohort circles. Based on this coding round, I further developed secondary and tertiary coding categories to capture patterns of university-based cohort circles.

Findings

'Bamboo ceilings': Chinese immigrants' disadvantages within the workplace

A 'bamboo ceiling' is defined by migrant scholarship as 'an invisible barrier that keeps Asian Americans from rising to the upper rungs of the corporate ladder and assuming leadership positions in a way similar to how the 'glass ceiling' blocks the progress of women' (Lee and Zhou 2015: 134). The 'bamboo ceiling' is a predominant phenomenon in the high-tech industry. Specifically, Asian immigrants, especially those from China and India, have been overrepresented in high-tech work since the late 1990s.[4] However, Asians are severely underrepresented in managerial positions and positions of authority and always have lower ratings in promotability despite high ratings in technical skills (DiTomaso and Smith 1996; Gee et al., 2015).

Such a 'bamboo ceiling' phenomenon was precisely manifested in the Pipe Org. During the year when I conducted my fieldwork, 20 engineers were promoted, and none of them were Chinese engineers. In the two teams that I observed most closely (Knight team and Wizard team), nine engineers entered the company at almost the same time, four engineers were promoted from the junior level to senior level during my research year and all of them were 'white' engineers.

While my Chinese interviewees viewed the tech industry as being more 'objective', and 'meritocratic' than other industries, a majority also shared that they had experienced mistreatment, exclusion from the inner circle and hitting a 'bamboo ceiling'. Unfair assignment of software development projects was a typical phenomenon. As Sun, a Chinese engineer working in the Shopping Recommendation Team at 'A Company', recounted, 'I haven't been assigned a single M-team goal project for two years. The other guy, who just came here working for eight months, got his M project ...'. An M-team goal project stood for a 'manager-level project', implying a large-scale project that offered enough space for engineers to present their abilities. Only after finishing an M-team goal project, could an engineer be considered for promotion. Typically, managers would start assigning M projects to engineers after their first year of work. In Sun's case, he had not received an M project after 2 years. Faced with what Sun saw as an insurmountable obstacle, he decided to switch companies.

Among my Chinese interviewees, many had been assigned tasks to facilitate their white colleagues. One interviewee, Jie, was forced to jump to another company after keep doing 'code refactoring' for other engineers for a year at Huli. As Jie narrated:

> ... After submitting the annual review, I knew I wouldn't be promoted this year. I did not even get a chance to design my own project at all for two years. What all I did were do refactoring for Paul. And Paul is such a hacker ... his code is crappy ... you have to admit that his ideas are creative ... and it seems like that is what really matters in this workplace, propose some good design ideas for a project, and then the project is yours. So you can write your own code from the beginning, you get the chance to design the logic, structure and stuff. That is what Paul did. Want to know what I did? cleaning the codes for him ... write the test for him ... refactoring, refactoring ...

Many other Chinese interviewees reported that they had facilitated their white colleagues writing tests or refactoring codes. As several Chinese engineers explained, although such also needed a level of creativity, in general, they were considered less creative than design tasks. The problem was that for western tech firms like Huli, innovation and creativity were essential in engineering work. So, Paul's design tasks were highly valorised while refactoring work accomplished by Jie was devalued and marginalised.

Cultural differences partially explained the Chinese engineers' disadvantaged position. While American culture valorised aggressiveness and self-promotion, Chinese culture valued modesty. Consequently, white engineers were more likely to fight for their favourite projects, whereas Chinese engineers hesitated to express their project preference overtly. In addition, compared to white engineers' self-promoted approach, Chinese engineers prioritised hard work over personality. As Fang explained,

I felt like white guys were more like … when they love what they did…when the project is challenged enough…they will devote 100% or 150% of their energy to the work, they worked during weekend … they did not sleep. But once they were in a bad mood, they can just not work and asked for OOTO[5] straight for two days. But I just treated it professionally … I consider myself a craftsman (shou yi ren). I got paid because of my craftsmanship … so I do what I am assigned … but they [white guys] felt themselves as masters … they only wanted the most creative task ….

From Fang's narrative, white guys' passion for 'challenging projects' legitimised their opportunities to obtain more creative projects, whereas to Chinese engineers, what mattered more was 'professionalism'. Consequently, Chinese engineers were more frequently assigned mundane tasks since they were willing to 'do what they are assigned'.

Exclusion from the 'white boys' club' was another type of disadvantage frequently experienced by Chinese immigrant engineers. Xiao, who worked in the GC core team at 'M Company' for one year and four months, reflected that the primary reason he was cut out of his manager's inner circle was his inability to go to the bars with his manager frequently. According to Xiao, members in the inner circle had more access to invaluable career opportunities, such as leading critical projects. As the outsiders of the team's inner circles, Chinese engineers were more vulnerable when their teams encountered turbulence, such as cutting off projects and re-organising teams. For example, GYW, who worked as a security engineer at 'G Company', reported that his project was the first to be eliminated when his team was asked to reintegrate resources to concentrate on developing one key feature:

I was quite prepared for this outcome … as my project was very marginalised … But I was still very frustrated at that time … I have been putting 6 months into this project, designing, developing and optimising.

Indeed, Xiao and GYW's complaints were representative of Chinese interviewees' experience of marginalisation.

Finally, the bamboo ceiling also could symbolise a barrier that kept Chinese immigrants from moving to a more secure and permanent immigrant path. Specifically, the stability of Chinese engineers was closely associated with their immigrant status. Only after Chinese engineers reached more senior levels within the company, were they better positioned to ask their employers to assist them in obtaining a more stable immigrant status, such as applying for a green card (i.e. permanent resident card) on their behalf.

For example, one interviewee Zijian, who had stuck at the junior level for the prior 2 years, reported that he had to hop to secure his legal immigrant status:

The time was very tight by then, as I know I have to hop to a more senior level as soon as possible. … my company would not conduct a third draw [of H1B] for a junior employee … So at that point, it's more like, either I jumped or I died … I mean, kicked out [of the U.S.]

By the time when Zijian made this decision, he had failed to be drawn in the H1-B lottery system twice and thus failed to make a smooth transformation from immigrant

student status (OPT [Optional Practical Trainin]) to professional working status (H1-B). And Zijian's company would not spend more energy assisting a junior employee to go through the H1-B lottery system for the third time. Ultimately, one month before his OPT expired, Zijian hopped to a small company and obtained a tech lead position. With his new company's assistance, Zijian obtained a third chance to gamble in the H1-B lottery system.

Job-hopping: Chinese way to break 'bamboo ceilings'

Chinese engineers realised that job-hopping was the most effective way of circumventing the 'bamboo ceiling'. For example, when Sun, the 'A Company' engineer mentioned above, failed to be assigned an M project after 2 years, he decided to hop to a different company: 'to be honest, I don't want to go through all the troubles to switch company … then I realised ... it's a dead-end here. I felt I had to wait for my manager to die to get an M project ...'.

When Chinese engineers switched companies because of the environment of exclusion, they attended to the ethnic composition of their new employers. While some Chinese sought a new team composed of predominantly ethnic minorities to avoid being tokenised, others looked for a team led by a Chinese manager. This strategy can be seen in one interviewee's narrative:

> the good thing about hopping is that you get … to start afresh … after accepting the offer, the hiring team provided me with a list of teams that potentially suit me. When I skimmed through the list, the first thing I paid attention to was these team managers' last name. I was looking for a last name that was a Chinese name.

Through finding a Chinese manager, this interviewee attempted to obtain more autonomy to lay down a good foundation for a future supervisor – subordinate relationship.

Many Chinese engineers explained that job-hopping really was their best shot to reverse their disadvantaged situation. One interviewee explicitly compared 'job-hopping; and 'internal transfer':

> Interviewer: have you considered internal transfer [of team] (huan zu)?
>
> Jun: Not really … I'd rather job-hop (tiao cao)
>
> Interviewer: Why?
>
> Jun: Maybe I am wrong … but to me, the cost of internal transfer and job-hopping are almost the same … like you need to spend almost the same amount of time familiarising yourself with the new projects and your new teammates, no matter you transfer or you hop.
>
> Interviewer: Then what's the pros for job-hopping?
>
> Jun: … for most Chinese … let's be honest … the reason why they want to leave their current team is that … hey see no choice of promotion, right? The problem is, you can't be promoted

from SDE one to SDE two by just transferring a team. But job-hopping can ensure at least a half-level promotion.

So, after working at 'A Company' for about a year as an SDE 1, Jun hopped to 'G Company' to obtain an SWE 4 position equivalent to an SDE 2 at 'A Company'. Jun's narrative mentioned that while the alternative of internal transfer could solve some disadvantages described above, unlike job-hopping, it could not ensure a promotion, the ultimate concern of Chinese engineers. Other interviewees confirmed Jun's statement.

The university-based cohort circle: Chinese immigrants' trump card in job-hopping

Not only did Chinese immigrants actively adopt the job-hopping strategy to break the 'bamboo ceiling', they also acutely recognised their university-based cohort circle as the unique resource they could draw on to enhance their job-hopping performance. First, the 'third wave' of student migration led to the influx of Chinese in the US elite universities, constituting the pre-condition of formulating a vast university-based network. Starting from the early 2000s, the number of Chinese overseas students increased rapidly, reaching 127,600 in 2009/10 and 372,500 in 2019/2020 (Statista, 2021). Many Chinese immigrant students chose to major in Computer Science or Electronic Engineering and targeted the tech industry's labour market niche. By choosing Science and Technology as their major, Chinese students filled the gap between the demanding tech industry and the American students' disinterests to study in this field.[6] In 2017, 81% of full-time graduate students in Electrical Engineering programs were reportedly international students, as were 79% in Computer Science. 70% of these two majors' students were from either India or China (National Foundation for American Policy [NFAP], 2017).

Recently, the emergence of joint-educational institutions between China and the US has provided a new trajectory of overseas study, further contributing to Chinese overseas students' concentration in the Computer Science field in the US.[7] For example, the Michigan-Shanghai Jiaotong (UM-SJTU) Joint Institute cooperative program mostly recruited students who majored in Electronic and Computer Engineering and Mechanical Engineering. Students in this program would have the first two years of undergraduate education in the Shanghai Jiao Tong University and the second 2 years at the University of Michigan. According to my fieldwork, in 2007, about 70 out of 220 students successfully transferred to the University of Michigan. In 2008, 100 out of 300 students transferred to Michigan. Thus, the UM-SJTU Joint Institute produced a critical nexus between educational institutions of the sending and the receiving countries, laying a foundation for UM-SJTU cohort circle formation.

Second, the flexible employment valorised in the tech industry normalised job-hop behaviour, which became a vital pre-condition for Chinese engineers to sustain their university-based cohort circle's vitality. As mentioned above, flexible employment and frequent job-hopping were highly valorised in the tech industry, a norm loyally supported by US Chinese immigrant engineers. My Chinese interviewees confessed that they hopped more frequently than their white counterparts, confirmed by the statistic record

from my fieldwork. By the time I finished the fieldwork, the average length for Chinese engineers to stick with the same company was 1.09 years, compared with an average of 2.38 for white engineers. The university-based cohort circle is able to expand due to these Chinese immigrant's constant job-hopping. This crisscrossing university cohort circle scattered over hundreds of companies in the US has, in turn, become an invaluable resource that Chinese immigrants can draw on to assist the job-hopping process.[8]

Formation and transformation of university-based cohort circles

The first type of university-based cohort circle is the double-cohort circle, which refers to the close friend circle formed by people who have been cohorts in Chinese universities and American universities. For example, students from the Michigan-Shanghai Jiaotong (UM-SJTU) Joint Institute conveniently constituted double-cohort circles. They shared the first two-year undergraduate cohort experience at Shanghai Jiaotong University and the second two years at the University of Michigan. Ricky, who transferred to the University of Michigan in 2007, described his transfer experience:

> … all 70 of us just directly transferred from China to here. For me, I don't even think that I have to adjust to the new environment too much … two of my former roommates also come to Michigan with me. Then we rent a house together …

The overlapped experiences among these cohorts made their ties naturally strong, laying a foundation for their future network in the labour market. In addition to the double-cohort created through the joint-educational experience, it was not uncommon for students graduating from the same Chinese universities' undergraduate program to apply to the same graduate program in the US together.[9] For example, Chinese elite universities, such as Tsinghua University and Peking University, were the fronts from which to transfer their students outwards to the top computer programs in the US. Therefore, students from these elite universities were more likely to be gathered in the same US programs and formulate these overlapped cohort circles.

The second type of social circle – the American university-based cohort circle – was much expanded. It was the product of the most popular overseas study trajectory – entering the master's program in Computer Science (CS) in the US after finishing the undergraduate study in China. A majority of this group's Chinese informants graduated from top-20 Chinese universities. Such educational background implied that they had relatively good learning and testing capacity, which assured their good GRE (Graduate Record Examination) and TOEFL (Test of English as a Foreign Language) performance and increased their chance of swarming into the top universities in the US.

The formation patterns of the University of Pennsylvania Cohort (UPenn Cohort), the Brown University Cohort (BrownU Cohort) and the Columbia University Cohort (ColumbiaU Cohort) represented such trajectories. When informants from these Cohorts recalled their university lives in the US, the core concepts organising their narratives were friend circles. The size of the friend circle was somewhat flexible. It could be as small as 4–5 people who shared highly overlapping overseas study experience (e.g. taking the

same flight to the US and renting the same house). Other times, the friend circle could be up to 20–30 people, owing to overlapping circumstances such as choosing the same courses or using the computer lab together. Take Suo's narrative, for example. According to Suo, there were at least 100 students in the engineering school at the University of Pennsylvania between 2010–2013. Suo knew half of them but settled to associate with a very small circle:

> Suo: ... I majorly just hung out with Tao and another two. Occasionally our circle played together with Hao's circle, Song's circle. But yeah … maybe I should reach out to more people. It's just that I am too indoorsy (zhai) … our boss (laoda), Tao, is better than me …
>
> Interviewer: better … in what way?
>
> Suo: I guess what I mean is that he is better at reaching out to other circles ... Like one time when I need to move all my stuff out of my apartment in 2 hours … because of the evacuation deadline, Tao called Hao and his friends to help me move and he also organises a hotpot dinner to thank them …

In Suo's discussion, he identified three circles: his circle, Hao's and Song's. Each friend circle usually consisted of 4–10 Chinese engineers and featured strong ties among members. Each circle had a core figure (e.g. Tao in Xing's circle and Hao and Song in another two circles). As implied by Suo, each circle's core figure also played an important role in connecting their small circle to the expanded circle and assisting their small circle to mobilise more resources from the expanded circle. Importantly, the two types of cohort circles described above should not be conflated with 'university network' in a general sense. Apparently, in comparison to the third type circle discussed below (i.e. the expanded alumni network), these smaller cohort circles were more exclusive and thus played a much more critical role in shaping Chinese immigrants' experience, not only in the earlier phase of their study lives but also later phase of work lives.

The final type of network – the expanded alumni circle – was larger and included two sub-types. The first was based on these engineers' undergraduate education back in China. For example, alumni who graduated from Tsinghua University, Peking University, Shanghai Jiaotong University would join their university-based WeChat groups. The second sub-type of alumni circle was based on American educational background. A majority of informants reported that they joined 'CMU Wechat circle', 'Brown U Wechat circle' and 'UCLA Wechat circle', in the virtual space. Unlike the smaller friend circles whose ties were more robust, the university alumni circle ties were much weaker but more extended. Each alumni circle usually consisted of 100–300 members. Most group members had not met each other in real life.

Three types of university-based relationships followed Chinese migrants' movement from the educational sites to the tech industry. The persistence of the university-based social ties endowed Chinese engineers with great advantages in the job-hopping market. For example, Chinese engineers managed to expand their university-based friend circle in the industry. Chinese immigrant engineers' high mobility in the tech labour market also stimulated the network expansion. The UM-SJTU case illustrates how job-hopping

facilitated combining two double-cohort circles. Before one core figure Chun joined 'A Company', two loosely connected UM-SJTU double-cohorts existed at 'A Company' – the 2011 double-cohort and the 2012 double-cohort. The job-hopping of Chun – the core figure of the 2012 cohort – to 'A Company' resulted in the consolidation of two cohorts. During Chun's onsite interview at 'A Company', he called together the 2012 cohort to have dinner. Chun later explained that he thought this dinner not only was helpful to bring together old friends but also allowed him to learn about the company, 'my friends are working in different teams ... At the dinner, I quickly learned what their teams were doing …'.[10] After Chun joined 'A Company', he started to search for other graduates from the UM-SJTU program. To recruit Dao from the 2011 double-cohort into their circle, Chun took advantage of 'A Company's mentor program and asked Dao to be his mentor. Through Dao, Chun also met Wen, another member of the 2011cohort. Four months after Chun joined 'A Company', he merged the 2011 and 2012 double-cohort circles. To sustain the newly expanded circle, Chun ensured that they had hotpot together every Friday.

The above case illustrated the close relationship between the university-based cohort circles and job-hopping. Chun's job-hopping was assisted by the UM-SJTU circle – a wide enough UM-SJTU circle guaranteed that Chun's friends were scattered over various teams at 'A Company', allowing Chun to obtain comprehensive information about the company. The success of Chun's job-hopping further expanded the UM-SJTU circle, as his joining to the company ultimately merged two double-cohorts.

Three patterns of job-hopping

In terms of patterns, job-hopping can be the product of mutual influence within the double-cohort circle, reflected from the UM-SJTU circle's job-hopping trajectory. There was a moment in 2013 when all core members of the UM-SJTU circle worked at 'A Company'. It was the golden time for the UM-SJTU circle, as they met together every night, eating, drinking, playing video games and poker. The golden time ended in May of 2013, marked by Ming's announcement of his leaving for 'G Company'. Ming's leaving stimulated Jiahao, who followed Ming to hop to 'G Company' by the end of 2014. Like Ming and Jiahao's successive hopping to 'G Company', Dao and Wen jumped to 'M Company' one after the other in 2014. Following Dao and Wen, Wei started preparing his job interviews and accepted an offer from 'F Company' in 2014. His move to 'F Company' successfully mobilised Chun to hop as well. By the end of 2015, Chun finished his job-hopping process to 'F Company'.

For the UM-SJTU circle, job-hopping was a continuous process. Chinese engineers were always disadvantaged within the workplace and thus had to be always prepared for job-hopping. To some extent, being exposed continuously to job market information increased the frequency of their job-hopping. When Chinese engineers job-hopped via their double-cohort circle, they drew on the strongest ties to assist the move. Such assistance offered by the strongest tie was considered the most accountable amongst three job-hopping patterns. Take the successive job-hopping of Dao and Wen amongst UM-SJTU circle as an example. After Dao hopped to 'M Company', Wen increasingly felt the

'code refactoring' task he was doing was a dead-end project, just as Dao had earlier. After consulting with Dao, Wen decided to follow Dao to move to 'M Company'. Only two months after Dao's promotion at 'M Company', Dao offered Wen an onsite interview where Dao was the principal interviewer. After the interview, Dao told Wen he could just fill out his interview evaluation form, which Dao should have completed as the principal interviewer. From Dao and Wen's trajectory, one can tell that the strong tie ensured Wen obtain unconditional support from Dao to facilitate his job-hopping. Wen's job-hopping features – very targeted, sound and effective – was commonly identifiable in the first pattern of double-cohort hopping.

The second job-hopping pattern operated around the American university-based cohort circle. This pattern played an essential role in securing Chinese engineers' jobs in an urgent situation, such as the expiration of their legal immigrant status. When immigrant engineers failed to obtain H1B status sponsored by their current employers, they urgently sought to hop, and mobilising the expanded connections from the American university-based cohort circle became the wisest strategy. The university-based cohort circle was more extensive than the double-cohorts and allowed Chinese engineers to be exposed to wider-ranging job information while at the same time being more accountable than the alumni network and ensured good quality assistance from close friends.

One member of the BrownU circle, Yang, graduated in June of 2013 to start working at 'O Company'. By the time he failed to get the H1B the second time in April 2015, he only had five months to stay in the US legally. Tuo, who was Yang's friend from Brown University, suggested Yang hop to a Canadian company in Vancouver. As Yang's closest friend from Brown, Tuo knew Yang's dilemma well: his wife, who also graduated from Brown, had already secured a teaching job in Seattle and did not want to move out of the city. Considering this situation, Tuo suggested that Yang target Vancouver. After all, the commute time between Seattle and Vancouver was less than three hours.

To help Yang, Tuo reached out to the expanded university network and recommended Yang to an upperclassman (*xue zhang*) at a small tech company in Vancouver. The upperclassman had already been promoted to a middle-level manager and promised Yang this job very quickly. The company was small and not ideal. Their upperclassman's support, however, was a silver lining. After learning Yang needed to endure the weekly commute between Seattle and Vancouver, the upperclassman ensured that Yang could leave whenever he secured a job in Seattle. In Yang's story, the expanded American university-based circle accelerated the speed of getting Yang out of the crisis. The upperclassman, who represented typical contacts in the expanded university-based circle, was very willing to become an individual sponsor for his lowerclassmen. This upperclassman's very individualised vouching for Yang in his company accelerated the speed of Yang's job-hopping.

The third pattern of job-hopping is associated with the broadest expanded alumni circle. Several features can be noted. The WeChat circle was located at the centre to organise the virtual platform's expanded alumni circle. Each university that I observed has this larger-scale university circle on WeChat, which usually consists of 30–100 members. Unlike in small alumni circles, people in this large-scale WeChat university circle are usually scattered in different companies and multiple locations in the US and thus rarely meet in real life.

Large-scale circles had a distinctive advantage. The information shared within the smaller circle was more likely to overlap, as the social positions of members within the two types of smaller circle described above were very similar. However, members in the more extensive WeChat-based university circle could offer a broader range of information due to their diversified career development directions. The job information included typical job opportunities in big tech corporations, in smaller companies, in tech departments in non-tech firms and entrepreneurial opportunities.

Compared to other open-access groups organised for job-seekers, the information provided within the alumni-based WeChat circle was more likely to lead to a real job offer. Information providers were more likely to share more relevant job openings within their university circle and were more incentivised to provide the internal references for their alumni. The discussion from Nan, who graduated from U Penn and was a 'G Company' employee, illustrates this well:

> … I almost instinctively posted all job-opening information on WeChat … I didn't post them on 'L Company' … why? … it might have something to do with my company's internal referral policy … for 'G Company', you need to fill a form … it involved both qualitative evaluation content and quantitative evaluation … I mean, for the U Penn circle, we have taken similar classes ... So it's just easier for me to evaluate them, I guess. And of course, normally, students graduate from U Penn, you know their quality can't be too horrible … so it's like another layer of guarantee … you don't want your colleagues to blame you for hiring someone incapable, right?

From Nan's discussion, one can probe several factors contributing to information providers' preference for university-based circles. First, the familiarity with people in the circle was built on having taken similar classes. So, Nan had a solid understanding of his alumni's technological competence. This helped him write the qualitative evaluation for his referees and ensured his evaluation could be trustworthy. Nan was more willing to do referrals because of his confidence in U Penn's alumni quality, ensuring that referring his U Penn alumni would not risk damaging his own reputation.

Conclusion

This article documents Chinese immigrants' experience in the tech industry in the US. Chinese engineers choose to adopt a constant job-hopping strategy to break the bamboo ceiling encountered in the workplace. The university-based social circle, which Chinese engineers form, sustain and transform into the tech labour market, has become a key resource to facilitate Chinese immigrant engineers' job-hopping.

Organisational theories developed the concept of 'bamboo ceiling' to capture an inevitable obstacle that ethnic minorities encounter in workplaces. Respondents in this study confirmed the bamboo ceiling's existence, in the form of unfair assignment of products, exclusion from the inner circle, not being taken seriously by colleagues. However, the study shows that Asian immigrants do not just passively tolerate the existence of the bamboo ceiling, but actively mobilise their agency to evaluate their

disadvantages, and use their resources (e.g. elite university-based circles) to compensate for these disadvantages. By tracking Chinese immigrants' self-sustaining and expanding university-based circles into the labour market to support various job-hopping strategies, this study attempts to give weight to workers' agency. It also identifies the advantage conferred by elite university-based circles in Chinese engineers' job-hopping processes. Analysis of the critical roles of elite university-based cohort circles shows how stratification of educational institutions may be reproduced in the high-tech labour market. Thus, the study provides a more nuanced analysis of Chinese immigrant professionals' experiences.

This study also points out that such effects of workers' agency is highly conditional and contextualised. Workers' agency cannot be assumed in a vacuum, and it cannot be concluded that all ethnic minority workers can actively and strategically bypass the bamboo ceiling. Two structural conditions enable the emergence of limited agency and mild resistance amongst tech workers. The first condition has to do with the historically specific context of Silicon Valley, namely, the flexible employment valorised in the tech industry that normalises Asian engineers' job-hop behaviour. Such a norm becomes a vital pre-condition for Chinese engineers to develop job-hopping as a resistance strategy to bypass their career disadvantages. In turn, due to their heavy reliance on job-hopping, Chinese immigrants have become the most mobile group in the US tech industry, further preserving the industry's flexibility. Relatedly, this study also alerts flexibility theorists that the analysis of American High-tech industry's flexible employment regime must be reconstructed to upfront its ethnicised dimension.

The second condition relates to the third wave of student migration, leading to the influx of Chinese students into computer science programs in US universities. Such Chinese immigrant students' concentration provides the foundation of university-based ethnic networks, which later become the critical resources that Chinese migrants draw on to facilitate job-hopping and challenge the 'white boys' club'. Attention to the complex patterns of university-based circle formation and their varied influence over different job-hopping strategies is particularly instructive for a sociological study of highly skilled immigrants. The article reveals an alternative type of immigrant network (the cohort-based circle) created amongst highly skilled immigrants beyond kinship and familial networks, enabling interconnection between higher educational institutions, a highly fluid labour market, and professional communities.

In sum, investigation of the highly fluid labour market and the third wave of student migration allows this study to take a closer look at the structural conditions that make Asian immigrants' agency possible. By revealing the interaction between structural conditions and the ethnic group's strategies, it provides a nuanced analysis of professional immigrants' agency and their striving for an alternative type of resistance in high-tech work.

Declaration of conflicting interests

Funding

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Notes

1. In 2017, tech companies assisted 900,000 to a million foreign-born Asian workers in applying for an H1-B visa so that these immigrants could temporarily work in the tech industry (Wakabayashi and Schwartz 2017). In 2014, the Equal Employment Opportunity Commission (EEOC, 2014) reported that the high-tech sector employed a larger share of Asian Americans than private industry overall (14%–5.8%).
2. Diversity reports submitted by major companies to the US EEOC (eg. EEOC, 2016) suggest that Asian workers in tech positions account for one-third of the total tech labour force in most prominent tech companies. For companies such as Yahoo and LinkedIn, Asian tech workers have become the majority of their labour force. According to Saxenian (2000, 2002), the majority of these Asian workers were foreign-born – 84% of Chinese and 98% of Indian (see also Ontiveros, 2017; Wakabayashi and Schwartz 2017).
3. The term 'bamboo ceiling' is used to depict the invisible barrier that keeps Asian Americans from rising to the upper rungs of the corporate ladder and assuming leadership positions in a way similar to how the 'glass ceiling' blocks the progress of women (Lee and Zhou, 2015).
4. According to 2010 Census Bureau statistics, the percentage of Silicon Valley's Asian tech workers grew from 39% in 2000 to more than 50% in 2010 (US EEOC, 2014, 2016). The proportion has since risen further (Scott et al., 2018; Kim et al., 2020).
5. OOTO means out of the office, which is a format of personal leave requests.
6. The US tech industry had experienced a labour shortage for decades, yet the numbers of Americans willing to study Science and Technology has declined (US Bureau of Statistics, 2015).
7. According to China's Ministry of Education, there were about 1090 active Chinese-foreign cooperative institutions in 2018 (Redden, 2018).
8. First-generation Indian immigrants suffered similar career disadvantages to Chinese, such as unfair job assignments and exclusion from the 'white boys' club', and job-hopped more frequently than their white counterparts in my field site. But instead of relying on the university-based cohort circle, Indian engineers were more reliant on networks developed from their ethnic community. Even engineers who graduated from the Indian Institute of Technology (IIT) and thus possessed this very privileged alumni network, actually used both alumni and community networks to facilitate job-hopping. One reason was that Indian immigrants were more likely to live within the same community. Unlike Chinese engineers who mainly bonded with their university friends, Indian engineers formed their bonding along familial and community lines. Indeed, I was invited to have a vacation together with my Indian friends during the weekends and found that their travelling groups usually consist of three – five family units.
9. Take one Tsinghua-Carnegie Mellon University (hereinafter abbreviated to Tsinghua-CMU) circle. It consisted of four members, including Xin, Yu, Yuan, and Peng. They became

acquainted via the computing contest titled Association for Computing Machinery-International Collegiate Programming Contest (ACM-ICPC), while pursuing their bachelor's degree at Tsinghua University in Beijing. After graduating from Tsinghua, all four accepted the offer from CMU, whose Computer Science (CS) program was considered one of the best in the US.

10. When Chun tried to collect different teams' information in the dinner break, he was actually trying to finish the last step of the job-seeking process, called 'team matching' in the US tech industry. This usually happened after the onsite interview. It was not uncommon for an engineer to fail the job-seeking process if he could not find a matched development team within a specific time. Thus 'team matching' involved two-way selection between the engineers and the employers. If the job candidates failed to prove they were suitable for the position in the team that they were interested in joining, they could still lose the job offer. Therefore, Chun's collection of team information in the dinner actually helped him increase the chance of passing the last step of job-seeking – team matching.

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