

**Cashing in on the sky: financialization and urban air rights in the Taipei
Metropolitan Area**

Hung-Ying Chen, Department of Geography, Durham University, Durham, UK

Corresponding author: Hung-Ying Chen, Science Laboratories, Durham University, South Rd,
Durham DH1 3LE. E-mail: hung-ying.chen@durham.ac.uk

DOI: 10.1080/00343404.2019.1599104

Cashing in on the sky: financialization and urban air rights in the Taipei Metropolitan Area

ABSTRACT

This paper focuses on urban air rights, property rights for the ownership, development and trading of the airspace above land parcels. A three-fold contribution is made to the study of urban financialization. First, urban air rights are explicated as a new empirical terrain for research into urban financialization. Second, air rights are conceptualized as ‘market devices’ that enable market-making processes and are deployed by an activist state to facilitate regulatory and socio-technical conditions for urban financialization. Third, case studies of urban Taipei show air rights take subtly different forms across financialized processes of infrastructure provision and urban renewal.

KEYWORDS

air rights; market devices; financialization; volumetric urbanism; Taipei

INTRODUCTION

Against the backdrop of rapid urbanization and vertical sprawl in Middle Eastern and Asian cities (Elinoff, Sur, & Yeoh, 2017), this paper focuses on the advance of urban air rights in the Taipei Metropolitan Area (TMA). Broadly understood, the creation and trading of rights to the air include aviation rights (Lin, 2016) and perhaps also carbon emission rights (Knox-Hayes, 2013). The air rights that concern this paper, however, are in the realm of urban processes, namely virtual property rights that enable the ownership, development and trading of the airspace above land parcels (Goldschmidt, 1964). A focus on urban air rights clearly chimes with research that, frustrated by the 'flat geography' derived from a top-down cartographic gaze (Graham, 2016), seeks to study what is variously described as 'vertical', 'volumetric' and 'aerial urbanism' (Adey, 2013; Harris, 2015; McNeill, 2009). However, this paper is primarily concerned with relations between urban air rights and the financialization of the built environment. Air rights would certainly seem to figure in the socio-material and vertical transformations of contemporary urban landscapes wherein high-rises and skyscrapers are physical manifestations of financialization (Weber, 2010, 2015). However, to constitute what we understand to be the defining feature of processes of financialization (O'Neill, 2018), this necessarily requires that urban air rights come to feature, in the first instance, in financial market circuits that variously fund private capital investments in and extract value from the built environment.

The existing literature addressing the financialization of urban processes typically highlights how specific types of commodified urban space become asset classes in global investment portfolios. Often focusing on built environments in Anglo-American post-industrial societies (Christophers, 2012; Fields, 2018; French, Leyshon, & Wainwright, 2011), what unites these asset classes is their anticipated income streams and prospective rents that can be bundled together and leveraged in the present to raise debt finance for investment. The entry point for studying the 'urban-financial nexus' was initially and largely residential mortgages (Harvey, 1974), and more recently subprime

residential mortgages in the United States and Europe (Aalbers, 2012; Langley, 2008). Subsequent research in the wake of the global financial crisis has expanded this remit to include the role of private finance and financial instruments in the rental housing sector (Fields & Uffer, 2016); commercial property market (Crosby & Henneberry, 2016); mega-urban development projects (Guironnet, Attuyer, & Halbert, 2015); and the securitization of prospective property taxes (Pacewicz, 2016). However, if we broaden our analytical horizons to consider the proliferation of related financial instruments and asset classes, and shift geographical focus to processes of urbanization in the Middle East and Asia, a further feature of the contemporary financialization of the built environment becomes apparent: the role of urban air rights above the space of the city. While mortgages, securitization techniques, etc. have been found to imbue urban processes with financial market rationales, logic and practices elsewhere in the world, in Asian and Middle Eastern cities the socio-technical operations of urban air rights would appear to play a similar role in the financialization of the built environment.

To elaborate upon the workings of urban air rights in the urban–finance nexus, this paper draws on aspects of fieldwork conducted between 2014 and 2017 in the TMA, including Taipei City and New Taipei City. As part of the broader project that researched the emergence and proliferation of urban air rights in the TMA from the 1990s to the present, the fieldwork comprised archival documentary research and analysis, semi-structured interviews, and focus groups. The archival research analyzed a range of policy and project reports that, for example, laid the foundations for the two case studies presented below. A total of 38 semi-structured interviews were undertaken with market intermediaries (i.e., broker-dealers, planners, appraisers and redevelopers) and government officials, and three focus groups were conducted with local residents and industry professionals. The development of the second case study presented in this paper was greatly assisted by one of the resident-based focus groups and semi-structured interviews with a redeveloper and government

officials.

This paper makes a three-fold contribution to extant geographical research into urban financialization. First, and most obviously, it initiates an enquiry into urban air rights as a new empirical terrain for geographical research. This is consistent with the recent broadening of financialization research noted above, and opens up a consideration of financialization processes that attempt to ‘cash in on the sky’ and operate above and beyond (but not separate from) related property markets and urban infrastructure projects. Accordingly, the next section provides a brief introduction to urban air rights, especially as they take the slightly different forms of bonus air rights, offsets and permits. All these forms of air rights are found in the Taiwanese context and, in particular, in this paper’s case studies of the TMA, wherein multiple applications of urban air rights are identified as operating within three policy-making instruments: bonus floor area (BFA), transferable development rights (TDR) and incremental floor area (IFA).

The second contribution is conceptual. At the intersection of political economy and cultural economy approaches to urban financialization, there is particular interest in the significance of the workings of a range of various provisions and apparatuses (e.g., legal, planning, socio-technical) to processes of change (e.g., Langley, 2018; O’Neill, 2013; van Loon & Aalbers, 2017). Such provisions and apparatuses are typically understood to come to the fore as state policy is reoriented towards the leverage of private finance and the making of assets in support of urban processes (O’Neill, 2018). As outlined below, urban air rights are conceptualized as ‘market devices’ (Muniesa, Millo, & Callon, 2007) to foreground both their multiple operations in processes of market-making and their deployment as a policy instrument by an activist state seeking to facilitate the necessary legal, regulatory and sociotechnical conditions for advancing and deepening urban financialization processes (O’Neill, 2013). The critical utility of ‘market devices’ in this respect is held to turn on its

capacity to hold together the amorphous and multifaceted qualities of urban air rights across multiple markets and urban policy interventions. Air rights are devices that make possible commodified and volumetric ownership claims simultaneously in primary urban property markets by various stakeholders; the secondary trading of marketized rights to build by urban redevelopers and investors; and the leverage of debt against portfolios of volumetric assets which are capitalized upon because they are deemed capable of yielding a future revenue stream.

The third contribution is more analytical. As the final section shows, illustrated by two extended case studies from the TMA, air rights as market devices take subtly different forms when deployed in the urban projects of activist state policy. As the case studies demonstrate, the specific forms air rights take are important to how their operations facilitate processes of financialization across urban infrastructure and housing projects. Taipei arguably exemplifies global tendencies presently shared amongst cities wherein financialized urban processes are manifest in high-rise building booms, largely decoupled from local demands for affordable housing and infrastructure. Large-scale and fast-paced high-rise building construction has incited a series of environmental and societal concerns. What begins to be revealed through the analysis of the case studies, however, are the diverse ways in which the workings of air rights as market devices contribute to disrupting the so-called property cycle and sustaining the decade-long vertical property boom of urban Taipei. The analytical contribution of the paper thereby underscores wider calls for geographical analyses of financialization to be sensitive to spatial variegations as it moves beyond Anglo-American heartlands (Christophers, 2012). Air rights in the TMA have all made cashing in on the sky possible, but have been variously configured as market devices for financialized public infrastructure provision and private residential renewal.

URBAN AIR RIGHTS

Urban air rights refer to the right to build, own, use and decide upon the appropriation of the vertical space above a designated tract of land. The legal concept of air rights was initially based on the Latin legal maxim *Cujus est solum, ejus est usque ad caelum*, meaning 'for whoever owns the soil, owns the sky' (Goldschmidt, 1964). It is derived from English Common Law and was first laid out through the institutional planning practice of the zoning system that specifies the type and density of land use of each zone across a city (Marcus, 1984). Set within the zoning systems, urban air rights typically detach the right to build upwards from the underlying and designated surface use of the terra firma.

The earliest urban air rights on record were created with the redesign and redevelopment of New York Central Terminal, completed in 1913 (Noble, Noble, & Costa, 1993). According to Goldschmidt (1964), the urban air rights created in relation to New York Central Terminal were detached and subsequently exercised in the building of 18 skyscrapers along Park Avenue through to 1929. It was not until after 1945, however, that urban air rights began to be extensively created as part of urban development in the United States. It was also during this period that urban air rights travelled across the globe, packaged into policy instruments as part of technical advice in urban planning programs.

Through this mechanism of policy transfer, urban air rights found their way into the modern urban planning system in Taiwan. Under the Kuomintang (KMT, Nationalist Party) regime, local Taiwanese bureaucrats collaborated with technical advisory groups from the United Nations and USAID to adopt North American zoning techniques into the Taiwanese urban planning system. The current three-dimensional planning system can thus be dated to the 1964 Urban Planning Act. Between the 1960s and 1990s, urban Taipei experienced four property cycles. However, it was the over-a-decade-long property cycle between 2002 and the mid-2010s that coincided with the marked and considerable expansion of the air rights economy in urban Taipei. In 2015, the World Bank published a research report entitled *East Asia's Changing Urban Landscape: Measuring a Decade of*

Spatial Growth (2015), which listed Taiwan as having the second highest proportion of urban land (5.3%) just behind the city-state of Singapore. Regarding the pace of new urban construction, Taiwan is again listed as the second highest new urban construction per capita (260 m²), which only fell behind Laos (280 m²) during the period 2000–10. While these statistics may not precisely reflect the expansion of urban airspace in urban Taipei, Figure 1 further uses building usage license data to show that the proportion of high-rise buildings above 30 m within the total new buildings have significantly increased since 2002. This was the period in which the activist state developed a proliferating array of policy interventions that mobilized air rights to unlock private finance for urban development and renewal. While a full review of the property cycles of Taipei is beyond the scope of this paper, how longstanding provisions for urban air rights have come to the fore in the most recent property cycle is key to understanding their role in the financialization of Taipei's urban built environment.

Once separated from their underlying land parcel, urban air rights are widely recognized by urban planners to take the forms of bonus air rights, offsets and permits (Table 1). Each is generated differently and enables different economic mechanisms and practices, but each can also be combined with specific urban policy initiatives and applied to particular locations. Bonus air rights in Taiwan take the form of a BFA, a planning instrument known as a floor area ratio (FAR) bonus in some US and Japanese cities and as a bonus plot ratio in the UK, Australia and Hong Kong. Offset air rights in Taiwan are chiefly TDR, which is also a common category of urban air rights elsewhere. Finally, air rights in their permit form are mainly known as IFA in Taiwan, a policy instrument established in the early 2010s, which is also beginning to be adopted in urban planning policy in Brazil and Indonesia.

Table 1. Typologies of Urban Air Rights

Mechanisms	Properties	Forms	Purposes for Planning	Findings
Bonus Floor Area (BFA)	<ul style="list-style-type: none"> - Area-based, one-off, non-transferable air right; - Transaction only occurs in the package of project ownerships (namely shifting hands of developers) 	Bonus credits	<ul style="list-style-type: none"> - Fungible for Urban Policies (e.g. building qualities and socially-oriented service/amenity provisions) - Rebuilding Subsidy 	- The expansion of BFA credits/coupons is reinforced by its stretched items of exchange and the relaxed zoning caps.
Transferable Development Rights (TDR)	<ul style="list-style-type: none"> - Directly tradable, mobile and divisible air rights; - Transferable by contracts and TDR permits 	Offset permits	Offset credits for compensating property rights restrained by (1) historic preservation; (2) natural conservation; and (3) urban public infrastructure projects	<ul style="list-style-type: none"> - The expansion of TDR credits is evolved with, and emerges through, the increasing reliance on market-based instruments for debt relay. - TDR and their derivative features allow hedging, arbitraging and speculating investments by developers/investors
Incremental Floor Area (IFA)	<ul style="list-style-type: none"> - Area-based, non-transferable air rights; - Earmarked to infrastructure projects 	Permits	Public debt instrument	- The inception of IFA credits mimics the rationale of BFA and TDR as a value capturing instrument for infrastructural financing

Bonus floor area (BFA)

BFA is a market-based incentive mechanism that rewards developers who either comply with a design standard or provide public facilities. It is a non-transferable air right issued by market intermediaries at the discretion of local public authorities. Associated with a project on the underlying site, BFA entitles the developer to build additional floor area on the same site and is only transferable in the context of overall project ownership. In Taiwan, BFA became incorporated into comprehensive planning after 1983, and was typically used as part of planning and construction of parking lots between 1995 and 2011. Subsequent to the global financial crisis, however, BFA has been more widely used as an incentive to accelerate urban redevelopment programs across a range of planning policies in Taiwan. In the TMA, for example, this includes the conservation and maintenance of historic buildings, the construction of energy-efficient and 'greener' buildings of all types, and the creation of private open spaces within residential and commercial complexes. Across these myriad and multiple applications, BFA may range between 10% and 50% of the legal floor area of the underlying land parcel. In short, the prolific application of BFA is now often legitimated on the grounds that it assists planners and policymakers in addressing social and environmental needs more widely.¹

Transferable development rights (TDR)

TDR are a market-based offset tool that allows the urban air rights created in relation to one site to be moved and exercised at another site. They are the creation of intermediary institutions and land brokers who identify potential land parcels that meet the requisite conditions of local regulations. Moreover, for TDR to be redeemed as officially authorized permits, they are first traded as offset credits through various secondary market arrangements that can include public auctions (Vejchodská,

¹ Confidential interviews with three officials from New Taipei City government, November 9 and 13, 2015.

2016), stock exchanges (Sandroni, 2010) and private markets (Shih, Chiang, Chang, & Chang, 2017). This also introduces a speculative character to TDR that is not present in other urban air rights, or indeed their application in theories of urban planning.

The initial adoption of TDR globally sought to mitigate trade-offs between development and conservation, spreading worldwide from the 1980s (Renard, 2007). TDR were first introduced into Taiwan in 1996 as part of cultural conservation programs. Thereafter, TDR were integrated more broadly into local government attempts to build and renew urban infrastructures across Taiwan. In the TMA, for example, local governments tend to compensate landowners who are subject to zoning and acquisition restrictions on their right to development with regulations that facilitate the creation of TDR. Secondary markets for TDR in Taiwan are characterized, moreover, by trading operations of arbitrage and future-oriented pricing strategies imbued with a derivative logic. Prices for TDR are typically arrived at in relation to the prices of other similar asset classes instead of underlying land values, and trading takes place without the actual delivery of the underlying assets.

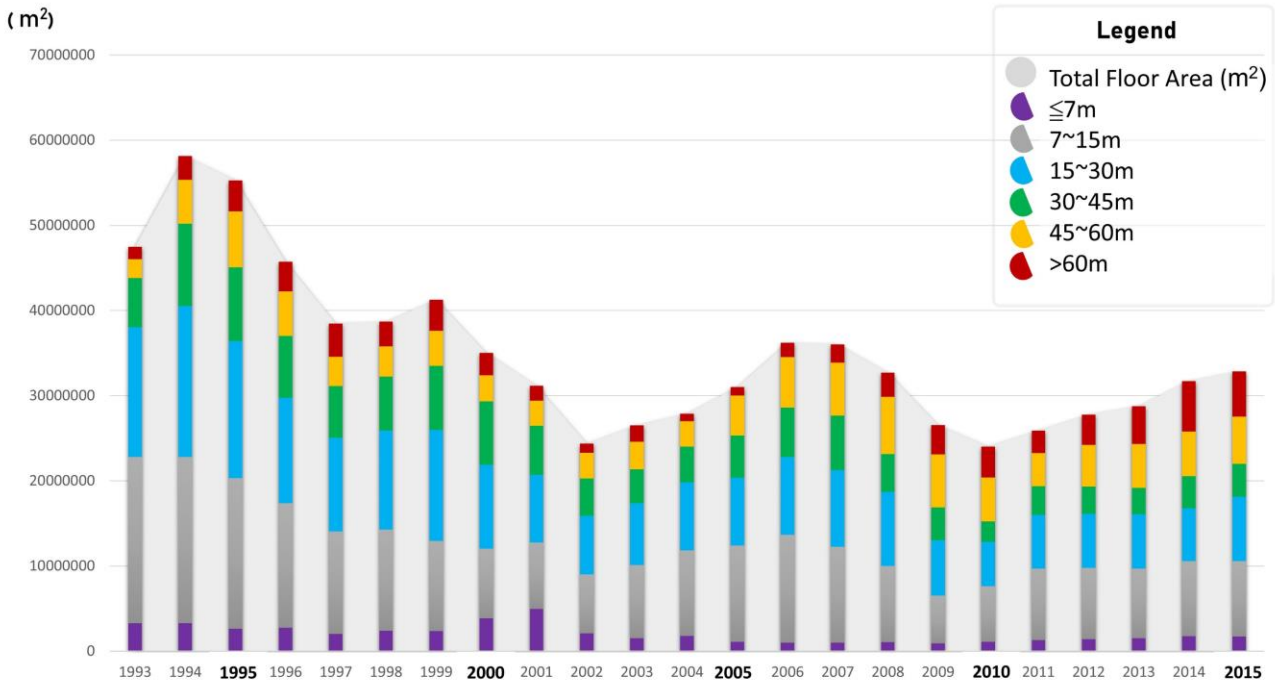


Figure 1. Nationwide building usage licence by height, 1993–2015.

Source: Author from the Ministry of Interior and National Statistics, ROC (Taiwan), 2015.

Permits

The third, emerging type of urban air rights is the permit form. Akin to BFA, permits are an urban air right that is non-transferable and remains affixed to the underlying site. Unlike BFA, however, permits are issued by local municipalities and sold to developers in order to build additional floor area on the same site, typically in the immediate surrounding area of a public infrastructure project. Permits are the most recent form of urban air rights, only emerging sporadically worldwide after the 2008 global financial crisis. In the TMA, urban air rights as permits are known as IFA, but this form does not have a common name globally. Local governments in Taiwan are authorized to sell such permits that are ear- marked for urban infrastructural financing. Moreover, in the TMA, a building credits bank for IFA has been established for reclaiming some control from the TDR markets more broadly.

URBAN AIR RIGHTS AND FINANCIALIZATION: MARKET DEVICES

To begin to understand the ways in which urban air rights facilitate multiple and related processes of primary and secondary marketization and financialization, it seems appropriate to conceptualize them as ‘market devices’ (Muniesa et al., 2007). The concept of market devices emerged in response to cultural economists’ concerns with the socio-technical tools and techniques mobilized in processes of market-making. It refers to ‘a wide array of objects’ that are material and/or discursive in character and which variously constitute processes of market-making through their operations (Callon & Muniesa, 2005). Put differently, conceptualizing air rights as market devices allows one to explore them as ‘objects with agency’ in market-making processes (Muniesa et al., 2007).

Conceptualizing urban air rights as market devices also has the added benefit of productively connecting understandings of air rights with the growing body of research across political and cultural economy approaches that is particularly interested in the significance of the workings of various provisions and apparatuses (e.g., legal, planning, socio-technical) to processes of urban financialization (e.g., Langley, 2018; O’Neill, 2013; van Loon & Aalbers, 2017). Such provisions and apparatuses are typically understood to come to the fore as state policy is re-orientated towards the leverage of private finance and the making of assets in support of urban processes (O’Neill, 2018). This includes, for example, research that addresses how policy instruments that are repurposed into debt instruments (e.g., Klink & Stroher, 2017) and calculative tools of valuation refigure landed property and urban infrastructure as financial assets and investment vehicles (Allen & Pryke, 2013; O’Neill, 2018). Crucial to connecting urban air rights to this research, however, is the extension of the concept of market devices to refer to both their multiple operations in market-making processes and their deployment as a policy instrument by an activist state seeking to facilitate the necessary legal, regulatory, and socio-technical conditions for advancing and deepening urban financialization

processes (O'Neill, 2013). Urban air rights, then, are conceptualized here as market devices to centre analytical attention on their dual workings: policy instruments as economic *mechanisms*, on the one hand, and their products that take legal–economic *forms*, on the other.

Mechanisms

Urban air rights constitute three related processes of marketization that can be understood as both analytically and empirically distinct – commodification (also known as primary marketization), marketization (the secondary marketization of rights to build) and capitalization. Jane Jacobs's observation on cities and economies is an informative heuristic here for understanding how the concept of market devices advances an understanding of urban financialization as manifold marketization processes. Financialization is thus a process that 'put[s] old goods and services to new uses' and 'employ[s] them in new combinations of work' (Jacobs, 1970, p. 68). In this case, urban financialization actually entails the combination of multiple marketization processes at once.

First, commodification is the elemental process reframing urban airspace as volumetric property that can be claimed and owned. Specific socio-technical arrangements are facilitated through the selective presence and absence of the state, whereas urban policy and regulatory frameworks lay the foundation for market intermediaries to create, measure and quantify air rights commodities, and the state holds discretionary power to (in)validating the right to build, access, obtain and control the urban airspace. In Taipei, the processes of converting urban air into volumetric property ownership are variously legally authorized by local governments and refigured into building credits that are attached to or detachable from a designated site. The three-dimensional trope of property ownership unsettles the established physical structure and its claims, collapses abstract and physical urban spaces, and expands the resembled space into a malleable frontier for diversified and complex sets of ownership claims. This is crucial to the fungible quality of urban air rights, as ownership claims

by urban developers may, for example, be appropriated by financial investors and thus transformed into an asset class (Muniesa et al., 2017).

Second, urban air rights also make possible processes of marketization wherein ownership claims on the urban sky are bought and sold through a series of secondary market arrangements, most notably the TDR market. In urban Taipei, air rights are made available on demand via either offset credits circulated in secondary markets or permits sold in governmental platforms. For instance, offset credits and their secondary trading in Taipei are predominantly processed by market intermediaries. Thereby, air rights are not merely stockpiled onto development sites but also generated through market practices – from site scouting to anchoring, trading, slicing and assembling. Consider that redevelopment projects are reformulated into the investment portfolio of air rights. Such portfolios are core to launch capitalization, which will be argued below. Secondary marketization of air rights, in essence, is critical to unveiling the ways in which air rights ‘unlock’ urban land value and become an investment channel in their own right.

Third, once urban air rights are assembled as volumetric assets in investment portfolios, they further evolve in processes of capitalization. They are borrowed against in the present for purposes of urban (re)development project loans and hedging risks of overbuilding. Capitalization is key to urban financialization as it captures the qualitative change of air rights from an investable object into an asset that potentially yields a future revenue stream (Muniesa et al., 2017). It is also a critical process that renders commodification and/or marketization into conditions for financialization.

Forms

To substantiate how air rights are shaping three-dimensional ownership claims and implicating property relations, this section now looks at the three forms of building credits they take: bonus, offsets and permits.

Urban air rights take the form of bonus credits that provide incentives for redevelopers to equip their building practices with concerns of socio-environmental mitigation (i.e., the provision of public facilities, green architecture and housing resettlement). Redevelopers acquire bonus credits through government-based planning reviews. These building credits are increasingly used to replace physical property for collateralized borrowing by pitching redevelopment into project finance. In so doing, air rights become building credits for the redeveloper and related property owners to draw down funding and repay at a later date.

Moreover, building credits in forms of offsets and permits are cast as the emerging resource terrain for value capture finance that is mobilized to support both state-led public infrastructure and urban redevelopment projects (Gandhi & Phatak, 2016). The difference between offsets and permits, then, appears in its platform of circulation. Offset credits are traded between brokerages and investors, whereas permits are issued through the primary market facilitated by the state. They share the same motive that air rights are morphed into building credits so that the fiscal expenditure and compensation for public services and facilities could substitute money compensation. The credibility of building credits is built upon the future income streams promised by the fluid careers of air rights – a cheaper alternative of investment into purchasing and developing urban land parcels.

While (re)development activities increasingly emphasize pursuing the expansion and circulation of building credits, these forms of building credits are analytically important because they reveal the

asset-making processes and unsettle the very politics of redistribution. Essentially, building credits are the nitty-gritty to enlarge the vertical territory of ownership claims. While techniques of assembling building credits redefine the core of redevelopers' profession in 'unlocking' potential land value, property owners were encouraged to offer their own land capital in order to acquire the growth of ownership claims. As such, the redistribution of building credits emerges not only as the object of dispute in urban politics but also as the spatial–financial registers that redistribute agencies. In this trope, air rights in various forms are also spatial 'things' that, as Çalışkan and Callon (2009) put it, travel and develop their own socioeconomic 'careers'.

CASHING IN ON THE SKY OF URBAN TAIPEI

Urban air rights as market devices are presently mobilized in numerous and context-specific ways across cities experiencing rapid vertical sprawl. This section examines how they are currently being mobilized in relatively specific socio-technical market practices and urban policy initiatives in the TMA. Specifically, the focus is on two concrete and ongoing instances to stress the diverse and relatively discrete forms that air rights can take. The first example is a policy initiative centring on a transport infrastructure project; the second is a residential housing renewal project. In the first, urban air rights as market devices primarily take the form of permits (IFAs), and are critical to constituting the commodification and state-led capitalization processes underpinning the construction and operation of the Greater Taipei subway system. The second exhibits how urban air rights are capitalized in the assembly of bonus (BFA) and offsets (TDR). In this instance, air rights are crucial to urban vertical sprawl and also facilitate private capitalization processes.

The Greater Taipei subway system

Plans to extend the Greater Taipei subway system to incorporate the newly established administrative area of New Taipei City – a new municipal city of 4 million inhabitants were first unveiled in 2010

as part of Mayor Chu Li- Lun's election campaign. The planned extension – often shorthanded as an additional 'three rings and three lines' sought to add 174 new metro stations to the Greater Taipei subway system and increase the total track length by 209.81 km.

Public transit systems are well known as capital intensive and marked by long-term investment and low revenue yields. They are, in short, an unwieldy object of financing (Ashton, Doussard, & Weber, 2016; O'Neill, 2013). However, funding the construction and operation of the planned expansion of the Greater Taipei subway system posed a particular set of problems for the New Taipei City government, which, in fiscal crisis, was also required by central government to operate within tightened public funding parameters. The New Taipei City government's public debt doubled during the five-year period from 2011 (New Taipei City Government, 2017). At the same time, central government public spending parameters – figured by the Cross-fields Value-adding Public Infrastructure Financial Planning legislation of 2012 – set the minimum local public finance ratio at 30% and encouraged local municipalities to embrace new financial instruments to raise capital, most notably, tax increment financing (TIF) mechanisms and various land-based instruments, discussed in detail below. Moreover, to access any public investment by central government in the subway system extension, the New Taipei City government was required to make a bid to a competitive process under the terms of the Frontier Infrastructure Plan of 2017, which proved unsuccessful.

Confronted by local fiscal crisis and new central government requirements, the New Taipei City government established a dedicated fund (New Taipei City Track Construction Development Fund) in 2011 for the planned Greater Taipei subway system extension. While the fund received some city government cash in the form of revenues redirected from other similar funds, the principal purpose of the fund was to explore a range of funding solutions. As expressed by the city government's Auditing Office, this was to be a transition from an 'operation fund' to a 'capital

plan' (Lee, 2015). Such a shift is a common feature of the financialization of urban infrastructure, which entails a subtle change from funding to financing. As explained by O'Brien and Pike (2017, p. 224), 'funding sources for infrastructure ... tend to be derived from taxation, user fees or other charges', while 'financing refers to the financial models that organize how the revenue (or funding) sources are turned into capital' (see also Langley, 2018). However, what is especially notable about the planned extension to the Greater Taipei subway system is that the shift to finance and a 'capital plan' came to involve the mobilization of urban air rights as market devices.

The urban air rights in question were part of the planning paradigm of transport-oriented development (TOD) that, in textbooks, provides a finance model for green transport projects. Intriguingly, in the case of the Greater Taipei subway system extension, TOD was used as a rhetorical tool through which a host of urban air rights were created on land parcels adjoining to and in the vicinity of the planned public transit facilities. In the first instance, potential sites of new development were identified near the public infrastructure. Changes to zoning codes elevated the buildable volumes on each site, such that urban air rights could be created by local government and sold in the form of IFA permits. Here, air rights as market devices are employed to draw out the private sector to pay for new transport infrastructure, and advanced in enacting an investment scenario of volumetric ownership.

Moreover, for the identified potential sites of redevelopment, developers also already had the option of exploring possibilities with intermediaries for the creation of further and additional bonus and offset forms of urban air rights (i.e., BFA and TDR). As such, the application of TOD in the Greater Taipei subway system extension was part of the local government effort to generate revenues by re-channeling developers into purchasing an IFA permit, responding to the relatively extensive use of BFA and TDR across the urban landscape of the TMA since the mid-1990s. Nonetheless, IFAs remain a relatively unattractive option for developers, as IFAs are relatively expensive ownership

claims on the air that have to be priced and purchased from the local government such that they can later be exercised by developers. In contrast, BFA and TDR are forms of air rights that, as market devices, are either free under local government regulations or relatively cheap to buy from specialist intermediaries.²

For air rights to operate as market devices and to play a constitutive role in the state-led capitalization of the Greater Taipei subway system extension, the New Taipei City government created a staged development plan that designates the sale of IFAs as a revenue stream for each of the multiple zones adjoining the subway system. It is these prospective revenue streams that the New Taipei City Track Construction Development Fund primarily uses for the sake of leveraging debt to finance investment in the subway system extension. In short, the local government pitches their fiscal projection by selling tranches of air rights in the form of permits to developers. In the terms of the government report (New Taipei City Government, 2014) on the feasibility of IFAs as an instrument of urban policy, the revenue streams captured from selling IFAs are calculated by dividing the annuities of the zones released in earlier stages against the total buildable zones that will be released in the planned timeline. The report then predicts a total income stream of NT\$6.9 billion to be generated solely by selling IFAs – a number exceeding NT\$4 billion, the fund's 2014 annual budget.

Despite concerns of environmental degradation raised by the planning department (New Taipei City Government, 2015), urban air rights were still mobilized for the Greater Taipei subway system extension. They were essentially imagined as an effective market device, and urban policy mobilized air rights as an active infrastructure funding vehicle. In the terms of local government, this was a matter of making the densification of adjoining and surrounding land 'a value-capture tool for metro

² Confidential interviews with a focus group made up of five participants who are developers and assembling experts, January 4, 2016.

infrastructure' (New Taipei City Government, 2014). It was also clearly a response to the expectation of the central state that local states should adopt a neoliberal ethics of 'self-sufficiency' into their 'anticipatory fiscal plan' (Lai & Su, 2013, p.54). While constituting processes of commodification and capitalization, urban air rights in their IFA form were also instrumental to altering the logic of governance and exemplified the neoliberal shift from funding to financing.

Residential renewal for the Da-Chen Community

The Da-Chen Righteous Compatriot Community (Da-Chen, for short), adjacent to the Xin-Dian River in Taipei City, is an immigrant neighborhood in the northern Yonghe district of New Taipei City (Figure 2). Da-Chen has been cast by the local government as a 'blight' settlement. Amidst the highly populated Yonghe district, which has an average of 40,000 inhabitants/km², Da-Chen is home to 1500 households in an 8.2-hectare site, whereby 75% of the households live in rented tenement housing, replete with makeshift alterations.

Though the New Taipei City government has prioritized Da-Chen on its renewal agenda for many years, achieving a redevelopment that would transition the housing tenure of the population in the area from informal settlers to owner-occupiers has proven problematic. Developers were discouraged by the financial circumstances of the majority of inhabitants, socioeconomic minorities who were typically unable to access mortgage finance. On several occasions, government tenders for the private redevelopment of Da-Chen failed to attract interest. In response, the city government set up a staged development plan for Da-Chen, dividing it into seven subzones and relaxing zoning restrictions on the potential building volume. Zone 2, discussed in detail below, was prioritized as an exemplary case that uses air rights to prompt a more positive response from would-be developers.

A local developer, Kei-Shen Construction, bid for the tender to renew housing in Zone 2, an area of

180 house- holds mainly living in housing of between two and four floors. Between 2011 and 2016, Kei-Shen Construction transformed Zone 2 in Da-Chen, which came to comprise 703 housing units across three 29-floor residential towers, 724 car parking spaces and 708 motorcycle parking spaces. At first, this remarkable volumetric growth would seem to have been a result of the discretion of local planning administrators: the statutory cap of 300% buildable volume that applied to Zone 2 was raised to a total of 663.29%. However, such planning provisions also significantly demonstrated the agency of urban air rights that could mobilize the redeveloper and fellow investors in the course of the project. On the underlying land of Zone 2, Kei-Shen Construction was able to deliver a blended portfolio of volumetric assets that assembled building credits in both their BFA and TDR forms. Additionally, the volumetric growth is skillfully pitched at an accurate 29-floor height because once a building is designed above 30 floors, the project will be subject to an environmental impact assessment.

Kei-Shen Construction made applications for BFA across a number of planning provisions and categories, accruing bonuses as a result of the application of particular design standards (e.g., environmental standards) and in return for constructing pedestrian footpaths and other public facilities and infrastructures and for making provision for the resettlement of informal settlers. This application was officially approved, with the effect of 50% legal FAR being added to the already raised statutory cap. Moreover, the redeveloper purchased offsets from the secondary TDR market. This enabled a transfer of 10,751.87 m² from other districts onto the underlying site, equivalent to a further 39% of the legal FAR. In such processes of redevelopment in Zone 2, then, the constitutive role of urban air rights as mechanisms for the commodification and secondary marketization of the urban sky were crucial.



Figure 2. Bird's-eye view of the Da-Chen Righteous Compatriot Community.

Source: Urban Redevelopment Office, New Taipei City Government. Retrieved August 1, 2017, from <http://www.uro.ntpc.gov.tw/>.

However, Kei-Shen Construction also used the portfolio of air rights on Zone 2 as building credits in two main ways. First, and typical of the mobilization of urban air rights as building credits in Taipei, the residents' properties will be equally converted into the renewed condominium unit, which is 5.1 times as big as their original legal possession. The project manager of Kei-Shen Construction explained: 'while residential towers are rather costly and generally inaccessible for residents who are social-economic minorities, a majority of the residents choose to increase their usable space by adding makeshift alterations without official approval'.³ Instead, the mobilization of urban air rights is presently an exceptional offer for these middle- and low-income households because the volumetric growth could transcend their existing asset thresholds, reorient the rights to rehousing towards future benefits and/or financial inclusion. Second, in a twist on the typical mobilization of urban air rights as building credits, urban air rights were crucial to raising the syndicated loan from seven banks to Kei-Shen Construction that financed the redevelopment of Zone 2, without further need for physical collateral. In this case, the portfolio of air rights further hinges the marketization of the urban sky onto the process of capitalization, making air rights capitalized assets.

Extensively, air rights as market devices had been employed in the scheme of redistribution and sorted and diversified residents' positions and judgements. For instance, the local tenants who have no residual claim were left uncounted. This is because tenancy is assessed as invalid for resettlement or compensation under the air rights regime. Having a proprietary ownership, nonetheless, does not always privilege the right to rehousing or the access to the residual claims of the development-based joint venture. In this case, there were 23 property owners whose property values were too small to be converted into a basic unit after renewal and were thus categorized as *ineligible* for residual

³ Semi-structured interview with the redeveloper of Da- Chen Community, January 4, 2017. The rule of thumb in such underwriting processes still requires a certain amount of collateral from the lender.

claims. For these owners, the alternatives are either to combine several people's property shares to exchange a unit or to receive the cash compensation from the redeveloper upon appraisal of the existing estate value. Moreover, a radical change introduced by the air rights regime is that of BFA for resettlement. The BFA for resettlement grants the redeveloper building credits to resettle informal settlers upon his/her deliberative choice. Selected informal settlers whose status qualified them to exchange such building credits (i.e., long-term residential record) will be resettled on-site and permitted 'right-to-buy' on offer of the construction cost. In this way, the rights to rehousing have been made equivalent to access to property ownership with the rendering of the logic of creditworthiness. Last, property owners who secure their rights to rehousing and residual claims are obligated to share the expense, which accounts for 54.45% of the cost of the redevelopment project. Instead of requiring residents to pay off the lump-sum project expense by cash, eligible shareholders are expected to repay by giving out this percentage of their land ownership to the redeveloper. To this end, the assembled portfolio of air rights is not merely the cheaper alternatives for developing private urban land parcels, but a pseudo-debt claim that works the other way around as the means for the redeveloper to acquire a significant share of land ownership of the project site.⁴

CONCLUSIONS

This paper explored the conception of urban air rights as market devices and how this helps to elucidate the financialization imbued in urban processes. It explained how air rights as market devices could be a method to map out urban financialization in Asian cities and beyond. Specifically, urban air rights make visible the connections across diverse market-based policy instruments and their wide

⁴ Confidential interviews with a focus group comprised of six local residents from Da-Chen Community, November 7, 2015. The economic incentives staged by the air rights regime were not complementary to reaching the residents' agreements. During spring 2015, there were 10–20 remaining households who rejected the redistribution scheme. While this case was acclaimed to be paradigmatic for its achievement of a 100% agreement, what underlay the process was a series of crackdowns on and demolitions of unapproved buildings launched in the adjacent Taipei City that affects the recalcitrant owners either to opt out or to agree to join.

applications in development finance. As such, understanding air rights as market devices makes legible the ways in which urban airspace are not merely a spatial unit for planning instruments but also operate in manifold related market-making processes, including primary and secondary marketization and financialization that can potentially evolve into models of debt or equity finance. Market devices show air rights' capacity as objects with agency. This is unfolded through three forms of building credits: bonus, offset and permit. These air rights, either bundled together or stand-alone, work beyond sites of redevelopment and are entrenched in market practices as credits.

Owing to space restrictions, this paper offers a relatively limited sketch of the market practices of air rights instrument. However, it extends to three concluding points. First, this paper introduces urban air rights as a novel empirical terrain for geographical research – a parameter for comparing across diverse planning and regulatory contexts. To abstract floor area ratio and plot ratio into air rights is not only an act of rephrasing but also enables translation across different urban domains. Also, the conceptual efficacy lies in its de-naturalization of the production of vertical sprawl.

Second, in responding to the special issue's theme on financialization in Asia, this paper contributes to the conception of air rights as market devices. This offers a middle-level analytical tool composed of both economic mechanisms and legal–economic forms and allows further exploration of the urban–finance nexus to capture movements and dynamics of financial reformulation within urban governance. For instance, this paper has reconfigured the facilitation of urban financialization through three cognate and tightly knit threads of urban processes: market-making, policy-making and asset-making. These findings have brought significant implications for understanding how relations between public and private urban finance are restructured (as shown in the case study of the subway system). Moreover, they advance a relational reading to understand the socio-technical deployment that is at play between the issues of dispossession and environmental mitigation.

Third, this paper unlocks the analytical potential to urban regions that are less invested with global capital and yet speculative. While TMA is not the typical global locus for financial investments, this paper has uncovered the underlying transformations of the grounded socio- spatial practices such that the constant (un)making of financialization can be observed. With the exemplars of both infrastructure provision and urban renewal, this paper points out the potential of researching the relation- ships of diverse urban domains and refiguring the dynamics of urban financialization by tracking air rights' socio-technical workings.

To conclude, this paper serves as an initial navigation of urban air rights and how their workings stitch the urban– finance nexus. Highlighting their socio-technical workings is thus a geographical critique of value capture tools and, more broadly, makes explicit that urban financialization could be reconsidered through the combination of existing and manifold marketization processes.

ACKNOWLEDGEMENTS

The author owes a special thanks to Paul Langley for his stimulating feedback and support throughout various versions of this paper. Earlier versions of this paper received useful comments from Gavin Bridge, Dariusz Wójcik, Kathe Newman and John Morris. Previous versions of this paper also benefited from discussions undertaken in sessions at the 1st FinGeo Global Seminar in 2016 and at the 2017 AAG Panel on 'Marketing Air Rights: Urban Solution or "Zoning for Sale"?'. Finally, feedback from three referees was very constructive. The author is solely responsible for any defects that remain.

REFERENCES

- Aalbers, M. (Ed.). (2012). *Subprime cities: The political economy of mortgage markets*. Chichester: Wiley-Blackwell.
- Adey, P. (2013). Securing the volume/volumen: Comments on Stuart Elden's Plenary paper 'Secure the volume'. *Political Geography*, 34, 52–54. doi:10.1016/j.polgeo.2013.01.003
- Allen, J., & Pryke, M. (2013). Financializing household water: Thames water, MEIF, and 'ring-fenced' politics. *Cambridge Journal of Regions, Economy and Society*, 6(3), 419–439. doi:10.1093/cjres/rst010
- Ashton, P., Doussard, M., & Weber, R. (2016). Reconstituting the state: City powers and exposures in Chicago's infrastructure leases. *Urban Studies*, 53(7), 1384–1400. doi:10.1177/0042098014532962
- Çalışkan, K., & Callon, M. (2009). Economization, part 1: Shifting attention from the economy towards processes of economization. *Economy and Society*, 38(3), 369–398. doi:10.1080/03085140903020580
- Callon, M., & Muniesa, F. (2005). Peripheral vision: Economic markets as calculative collective devices. *Organization Studies*, 26(8), 1229–1250. doi:10.1177/0170840605056393
- Christophers, B. (2012). Anaemic geographies of financialisation. *New Political Economy*, 17(3), 271–291. doi:10.1080/13563467.2011.574211
- Crosby, N., & Henneberry, J. (2016). Financialisation, the valuation of investment property and the urban built environment in the UK. *Urban Studies* 53(7), pp. 1424–1441. doi: 10.1177/0042098015583229.
- Elinoff, E., Sur, M., & Yeoh, B. S. A. (2017). Constructing Asia. *City*, 21(5), 580–586. doi:10.1080/13604813.2017.1374777
- Fields, D. (2018). Constructing a new asset class: Property-led financial accumulation after the crisis. *Economic Geography*, 94(2), 118–140. doi:10.1080/00130095.2017.1397492
- Fields, D., & Uffer, S. (2016). The financialisation of rental housing: A comparative analysis of New York

- City and Berlin. *Urban Studies*, 53(7), 1486–1502. doi:10.1177/0042098014543704
- French, S., Leyshon, A., & Wainwright, T. (2011). Financializing space, spacing financialization. *Progress in Human Geography*, 35(6), 798–819. doi:10.1177/0309132510396749
- Gandhi, S., & Phatak, V. K. (2016). Land-based financing in metropolitan cities in India: The case of Hyderabad and Mumbai. *Urbanisation*, 1(1), 31–52. doi:10.1177/2455747116644106
- Goldschmidt, L. (1964). *Air rights*. Chicago: American Society of Planning Officials. Retrieved from <https://www.planning.org/pas/reports/report186.htm>
- Graham, S. (2016). *Vertical: The city from satellites to bunkers*. London: Verso.
- Guironnet, A., Attuyer, K., & Halbert, L. (2015). Building cities on financial assets: The financialisation of property markets and its implications for city governments in the Paris city-region. *Urban Studies*, 53(7), 1442–1464. Retrieved from <https://journals.sagepub.com/doi/10.1177/0042098015576474>
- Harris, A. (2015). Vertical urbanisms: Opening up geographies of the three-dimensional city. *Progress in Human Geography*, 39(5), 601–620. doi:10.1177/0309132514554323
- Harvey, D. (1974). Class-monopoly rent, finance capital and the urban revolution. *Regional Studies*, 8(3–4), 239–255. doi:10.1080/09595237400185251
- Jacobs, J. (1970). *The economy of cities*. New York: Vintage. Klink, J., & Stroher, L. (2017). The making of urban financialization? An exploration of Brazilian urban partnership operations with building certificates. *Land Use Policy*, 69, 519–528. doi:10.1016/j.landusepol.2017.09.030
- Knox-Hayes, J. (2013). The spatial and temporal dynamics of value in financialization: Analysis of the infrastructure of carbon markets. *Geoforum; Journal of Physical, Human, and Regional Geosciences*, 50, 117–128. doi:10.1016/j.geoforum.2013.08.012
- Lai, T.-Y., & Su, W.-C. (2013). The issues on project for cross-field value-adding in public works financial planning [跨域加值公共建設財務規劃方案問題之探討]. *Journal of Public Administration*, 45, 41–

74.

Langley, P. (2008). *The everyday life of global finance: Saving and borrowing in Anglo-America*. Oxford: Oxford University Press.

Langley, P. (2018). Frontier financialization: Urban infrastructure in the United Kingdom. *Economic Anthropology*, 5(2), 172–184. doi:10.1002/sea2.12115

Lee, Y.-J. (2015). *The implications of types of fund to the disclose of budget information: The case study of New Taipei City Rail Construction Development Fund*. New Taipei City: Auditing Office, New Taipei City Government. Retrieved from <https://goo.gl/tzFpT5>

Lin, W. (2016). Re-assembling (aero)mobilities: Perspectives beyond the west. *Mobilities*, 11(1), 49–65. doi:17450101.2015. 1101904

Marcus, N. (1984). Air rights in New York City: TDR, zoning lot merger and the well-considered plan. *Brooklyn Law Review*, 50(4), 867–912.

McNeill, D. (2009). *The global architect: Firms, fame and urban form*. New York: Routledge.

Muniesa, F., Doganova, L., Ortiz, H. et al.. (2017). *Capitalization: A cultural guide*. Paris: Presses des Mines.

Muniesa, F., Millo, Y., & Callon, M. (2007). An introduction to market devices. *Sociological Review*, 55, 1–12. doi:10.1111/j. 1467-954X.2007.00727.x

New Taipei City Government. (2014). *Preliminary research on implementing incremental floor area on comprehensive development zones adjacent to MRT system in New Taipei City*. New Taipei City: Department of Budget, Accounting, and Statistics, New Taipei City Government. Retrieved from http://www.bas.ntpc.gov.tw/content/?parent_id=10224

New Taipei City Government. (2015). *A research on the principles of designating incremental floor area—A case study of San-Ying metro line*. New Taipei City: Planning and Review Division, New Taipei City Government.

Retrieved from <https://goo.gl/NJLvbg>

New Taipei City Government. (2017). *The condition of public debt*. Retrieved from

http://www.finance.ntpc.gov.tw/content/?parent_id=10505

Noble, M. A., Noble, A. G., & Costa, F. J. (1993). Floor area ratio as an urban development tool: The case of West Palm Beach. *Land Use Policy*, 10(2), 127–139. doi:10.1016/0264-8377(93)90004-T

O'Brien, P., & Pike, A. (2017). The financialisation and governance of infrastructure. In R. Martin & J. Pollard (Eds.), *Handbook on the geographies of money and finance* (pp. 223–252). Research Handbooks in Geography series. Cheltenham: Edward Elgar.

O'Neill, P. (2018). The financialisation of urban infrastructure: A framework of analysis. *Urban Studies*, 0042098017751983. doi:10.1177/0042098017751983

O'Neill, P. M. (2013). The financialisation of infrastructure: The role of categorisation and property relations. *Cambridge Journal of Regions, Economy and Society*, 6(3), 441–454. doi:10.1093/cjres/rst017

Pacewicz, J. (2016). The city as a fiscal derivative: Financialization, urban development, and the politics of earmarking. *City and Community*, 15(3), 264–288. doi:10.1111/cico.12190

Renard, V. (2007). Property rights and the 'transfer of development rights': Questions of efficiency and equity. *Town Planning Review*, 78(1), 41–60. doi:10.3828/tpr.78.1.4

Sandroni, P. (2010). A new financial instrument of value capture in São Paulo: Certificates of additional construction potential. In *Proceedings of the 2009 Land Policy Conference* (pp. 218–236). Cambridge, MA: Lincoln Institute of Land Policy. Retrieved from

<http://www.lincolninst.edu/publications/conference-papers/new-financial-instrument-value-capture-sao-paulo>

Shih, M., Chiang, Y.-H., Chang, H. B., & Chang, C.-O. (2017). Commodification of development rights and what it does to the urban housing market in Taiwan. *Journal of Planning Education and Research*.

doi:10.1177/0739456X17737139

- Van Loon, J., & Aalbers, M. B. (2017). How real estate became 'just another asset class': The financialization of the investment strategies of Dutch institutional investors. *European Planning Studies*, 25(2), 221–240. doi:10.1080/09654313.2016.1277693
- Vejchodská, E. (2016). Tradable planning permits versus auctioned tradable development rights: Different trading agents, different policy outcomes. *Journal of Environmental Planning and Management*, 59(8), 1418–1437. doi:10.1080/09640568.2015.1077105
- Weber, R. (2010). Selling city futures: The financialization of urban redevelopment policy. *Economic Geography*, 86(3), 251–274. doi:10.1111/j.1944-8287.2010.01077.x
- Weber, R. (2015). *From boom to bubble: How finance built the new Chicago*. Chicago: University of Chicago Press.
- World Bank. (2015). *East Asia's changing urban landscape: Measuring a decade of spatial growth* (Research Report). Washington, DC: World Bank.