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Value Capture and Vertical Allocations of Public Amenities

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Abstract: This paper describes and critically reviews an important but under-theorized value capture mechanism that we have termed "vertical allocations" (or vertical exactions). This mechanism enables cities to capture value vertically by allocating floor space for public utilities in privately owned, mixed-use, vertical development. As a value capture tool, vertical allocations allow the government to tap value uplift to supply the nearby neighborhood, and the city as a whole, with much needed public services. The owner or developer is required to make in-kind contributions in the form of spaces provided for a range of public facilities such as schools, preschools, community centers, and public medical clinics. While focusing on vertical exactions in Israel we explore how a certain share of land/floorspace can be allocated for public amenities in a given project. There are several legal pathways for securing public floorspace including negotiated agreements, land readjustment and expropriation. The findings show that unclear policies and regulations could create frictions between developers and municipalities, and these raise the nexus question as well as debates about construction costs and financial contributions developers have to make. Specifically, the paper finds that while developers often argue that cities should cover the costs of constructing public floorspace, city officials assert that the costs should be borne by the owners and developers.

Keywords: value capture; policy assessment; vertical development; public amenities; public-private cooperation

Citation: Mualam, N.; Hendricks, A.; Maliene, V.; Salinger, E. Value Capture and Vertical Allocations of Public Amenities. *Sustainability* **2021**, *13*, 3952. https://doi.org/10.3390/su13073952

Academic Editor: Miguel Amado

Received: 9 March 2021
Accepted: 25 March 2021
Published: 2 April 2021

1. Introduction

Land for public use is a vital need in any city [1] (p. 302), which is why government guidelines and legislation are applied to procure them through various policies such as land expropriation, consolidation and re-division [2,3]. As land in city centers becomes increasingly scarce, and growth pushes cities to their limits, allocating land for public use becomes more challenging and requires new solutions. Examples include progressive taxation, redefining property rights, incentivizing owners, and introducing value capture instruments [4,5]. Value capture enables cities to utilize unearned increments, meaning the increase in property value as a result of government intervention to which a property owner has not contributed [6]. Statutory planning can create value uplift that can be harnessed through value capture tools to supply a range of public benefits to the community, including land for public utilities.

In this critical review we look at a unique value capture mechanism applied in the Middle East by Israeli cities. Like other value capture processes, the end result is the supply of public land—or more specifically public floor space—for the benefit of urban residents [7]. The Israeli case exemplifies a situation where city administrations utilize value uplift to create vertical communities in high-rise developments in the city center where land is scarce and prices are relatively high [7,8]. Given the shortage of available land, and

potentially the absence of any publicly owned land in central neighborhoods of many cities, densification requires finding spaces for public amenities on privately owned land. These spaces can be created by vertically allocating floor area in mixed-use developments. We call this phenomenon "vertical allocations". For example, a high-rise residential building may contain public amenities on its ground floor, which is pre-designated for this purpose. In Israel, these areas are also owned by the public (the city). In the past, given that it was not customary to mix uses in Israeli cities, municipal public institutions were spread out horizontally rather than vertically, occupying a vast amount of land area [9]. Today, due to the depletion of land resources, together with the concern for the city's functionality, there is increasingly willingness to rethink how cities provide public amenities in densely populated cities [7].

This paper describes and critically reviews the practice of vertical allocations (or vertical exactions). Although existing literature has studied value capture, scholarly contributions have not emphasized the connection between value capture and vertical urbanization.

With respect to vertical allocations, we ask an overarching question: do value capture instruments take into account the need to create vertical public amenities in the city? Put differently, are there value capture regulations and policies that facilitate development that integrates public and private floor space and stacks them on top of each other? Specifically, we investigate several sub-questions: (1) What are the mechanisms for achieving vertical allocations, and what are their shortcomings? (2) What are the challenges for implementing vertical allocations? Additionally, (3) how can future vertical allocation programs be strengthened?

We focus the analysis on Israeli cities that have experimented with vertical value capture. Local governments tap value uplift to supply the nearby neighborhood, and the city as a whole, with much needed public services. Oftentimes, in exchange for bonuses for increasing the density, height and floor-to-area ratio, the owner or developer is required to make in-kind contributions in the form of spaces provided for a range of public uses. The city forfeits its ability to expropriate land, and instead, uses negotiated or non-negotiated pathways to reap the unearned increments. This case is also interesting because of the many challenges associated with vertical allocations and the bottom-up practice that was developed by Israeli cities in the face of a statutory lacuna. Other countries facing similar challenges rapid population growth, increasing property values in urban areas, lack of sufficient funds to finance public amenities, and scarcity of land –may glean important lessons from this case study.

2. The Literature on Value Capture, Verticality, and Exactions

2.1. Value Capture and Its Ability to Mobilize Value Uplifts

The theoretical foundation of this paper relies on the growing literature on value capture. The term refers to a range of policies and regulatory tools designed to tap unearned increments, value uplift, or improvement in property values [10–12]. The underlying premise behind the application of these tools is that an owner or developer enjoys value increases to his/her property that are the result of market fluctuations or the actions and interventions of public bodies such as local government, zoning boards, and other planning agencies [13,14]. As such, the government has the moral justification, as well as the power, to reap some of these values, extract them, and convert them into cash, in-kind services, or other public goods. The literature deals with a range of value capture instruments including betterment levies, land readjustment, impact fees, exactions, dedications, direct takings (expropriation) of property, tax increment financing, infrastructure and utility fees and levies [10,15–17]. While some countries have a strong tradition and a range of instruments to capture value, others are still taking their first steps. Cross-national learning is essential, because it can provide knowledge and inspire public officials to adopt best practices that work elsewhere [18–20]. However, a "one-size-fits-all" approach in comparative policy studies should be avoided, and the optimal tool box has to be adapted to country specific circumstances [21].

Value capture instruments mobilize value uplifts and internalize certain positive or negative externalities caused by development and its approval by government agencies [17,22]. However, before value is tapped by government, it is first created through a range of market-led, private, or public interventions such as changes in regulation, or via direct public investment [16,22,23].

The literature on value capture describes its multiple objectives, beyond the overarching goal of internalizing costs and benefits. On the ground, and usually on the local (urban) scale, value capture is utilized to finance capital improvements [14], as well as new public services such as linear infrastructure including roads, water pipes, and sewers [15]. Value capture allows governments and municipalities to create a pool of money to finance a range of other services as well, including the construction of civic buildings and public facilities [12,24], and to buy (or set aside) land for a variety of public utilities.

Furthermore, value capture tools have been used to generate monetary or in-kind contributions for the supply of land (or floor space) for public purposes [25]. They are also designed to deal with the scarcity of land through a range of policy interventions [26]. As an example, a developer and local government can negotiate on or off-site contributions of land [18]. Similarly, a developer can agree to supply land for open public space [27] or childcare facilities [28]. Other value capture tools, such as the community infrastructure levies in the UK, have been used to finance the building of public schools and parks [29].

2.2. Exactions and Other Pathways for Allocating Public Land through Value Capture

'Exaction' is a broad term describing requirements that the developer provide some kind of public good, including on-site or off-site facilities [18] or cash contributions in order to obtain permission to build [30]. In the United States, required exactions must be related to the impact of the development [31] and are used to defray the cost of additional services required as result of the new development [32]. Exactions can be negotiated voluntarily with developers or required by strict formulas and legislation.

The literature on value capture has pointed out the unique contribution of exactions through land readjustment and negotiated contracts to financing urban amenities [33–35]. While exactions through land readjustment are often carried out in accordance with a range of compulsory laws and rules, negotiations are voluntary and may not be bound by any legal provisions that limit the discretion of the negotiating parties. Like land readjustment, negotiated agreements are used "to exact public benefits in excess of what would otherwise be permitted by regulatory takings rules" [27] (p. 727). In some European countries, negotiated agreements have secured the provision of social housing on what was previously private property [22]. In New South Wales (Australia), these agreements have allocated land for a variety of purposes such as recreational spaces and public parks [36]. In the UK, contractual obligations paved the way for increasing the amount of affordable housing [37], for providing rights of way, and community buildings [38]. In the US, they have been used to provide a range of amenities and to regenerate downtown areas [33]. Additionally, agreements can require developers to construct the facilities themselves to specifications approved by the city, and then allocate the completed facility for public use [38] (p. 39).

Critics of these contributions have claimed that they are arbitrary, unequal, and make some projects unviable by demanding too much from developers [31,39]. Critiques also focus on the nexus between public requirements (the exaction, fee, or required allocation) and the property in question. The link between proposed development and the demands made by the local government is a recurring issue [40]. At times, these demands are accused of being unrelated to the development or its scale. Specifically, local governments have been criticized for requiring off-site amenities that are not necessarily linked to a given project. Municipal requirements are sometimes charged with encouraging profiteering by government [41]. As the value captured (and the public land that is provided) depends on land prices, exactions can take place where a single project can generate profits to a developer or value uplifts in general. Without uplift, the ability to require exactions and land allocations in general, diminishes. Otherwise, government requirements (such as

land, cash, or built-up floor space for public use) may reduce the project's affordability [42] (p. 110). This situation has led governments to conjure up a range of incentives and compensation such as density bonuses [43].

2.3. Value Capture, Incentives, and Verticality

The majority of scholarly contributions on value capture and exactions do not link them directly to verticality, let alone to the ability to join together public and private utilities. Some scholars, however, point out the link between value capture and densification. For example, Friendly [28] shows how "in Sao Paulo, within the context of vertical growth and city expansion . . . developers hoping to build at higher-than-permitted densities may gain additional floors" due to local legislation that provides bonuses "in exchange for financial compensation towards social benefits" (p. 2). Some value capture instruments implicitly assume that value can be created vertically, and land may be provided to the public in the form of floor area. Several scholars identify the transfer of development rights (TDR) as a planning tool that facilitates value capture by providing non-financial compensation to owners [44]. When private (or even public) rights are moved to another location, developers may receive density bonuses or even enjoy value uplift in the new location. In exchange, they may be required to provide public benefits in the form of floor space for public facilities. Thus, the transfer of development rights embodies vertical possibilities lying dormant in value capture tools, enabling it to accommodate vertical solutions to urban challenges such as regeneration, climate change, urban sprawl, creating mixed-use development, and protecting greenfields [45].

However, very few scholarly contributions focus specifically on the ability of value capture to generate public floor area in mixed-use vertical environs. Nevertheless, experts have documented this practice in East Asia. For example, in Saitama City (Japan), through land readjustment, the city's right to build public facilities on a given plot was converted into public floor space in a joint private and public venture [46]. Density bonuses, too, have been particularly instrumental in achieving vertical urbanism [47]. Through rezoning, re-parcelling, or other measures, these bonuses can encourage the provision of public services in a vertical-like development that contributes to mixed-use and compact development [48]. Existing studies show that this approach is especially evident in transit-oriented development [49]. For example, in San Francisco, generous density bonuses were given in one of the most ambitious transportation projects on the West Coast—the Transbay Transit Center. The project regenerated the surrounding area, created a new transportation hub, and provided public rooftop parking on top of a train station [50,51].

Likewise, in Seoul, Korea [52], property owners agreed to construct a mixed-use building in exchange for density bonuses. The building accommodated private and public spaces (including a pedestrian walkway, plazas, and a garden). In Vietnam, the city of Ho Chi Minh gave up public ownership to enable the development of a mixed-use high-rise tower (REE Tower), in which public open space was provided to the city in exchange for density bonuses [53]. In the United States, cities like Seattle have experimented with density bonuses to create compact development by enticing developers to incorporate public facilities in their high-rise buildings [54].

Although the population density in Germany is not as high as in Israel, there is a general priority for inner-city development in order to reduce suburbanization. For this reason, several tools—such as urban contracts—have been employed, some of which enable the vertical allocation of public facilities.

The general framework for urban contracts is regulated in Article 11 of the German Building Code. The most important group of contracts are the "contracts to cover the follow-up costs". They can be used to cover the costs of the municipality in the past or in the future which are a condition for or consequence of the proposed development. It is generally accepted that this regulation enables German cities through developer obligations to use value uplift and recover the cost of social infrastructure like kindergartens and primary schools [55]. Specifically, Munich was one of the first cities to utilize developer obligations

which are basically defined in a decision of the municipal council. The city adopted a 'socially equitable land use policy' (*Sozialgerechte Bodennutzung—SoBoN*) in 1994. This declaration increases the transparency and ensures equal treatment of all those involved. For this reason, the model has been adopted by many municipalities in the past 25 years.

In general, German developers have to pay for the demand for day-care facilities and primary schools. The need is determined according to the newly created living space, and a statistical key is provided for calculating the number of these public facilities. In most cases, however, larger public amenities are built to cover the demand of the surrounding area or to achieve reasonable sizes. In this case, the expenses are split and the developer has to pay for the share of expenses related to her development project.

Developers in Germany have to finance and support said public facilities in one of the following ways: (1) bear the actual construction costs of the social infrastructure (usually limited to day-care facilities and primary schools) or (2) replace this obligation with a proportional financial contribution of EUR100 per square meter of newly created living space (residential floor space); alternatively (3) developers themselves could take over the construction of the day-care facilities at their own expense. If the second route of financial contribution is chosen and the development plan stipulates that the day-care facilities will be integrated into a larger building ("integrated facilities"), an additional purchase agreement is required. Usually, the developers build such a facility at the request of the city and transfer partial ownership to it in accordance with the German Condominium Act (*Wohnungseigentumsgesetz*, *WEG*). In this case, the city bears the construction costs in accordance with national standards (DIN). If the public facility is inserted into a condominium, the floorspace on which it is located has to be provided to the city for free. This is in line with the principle of transferring ownership of common-use areas free of charge. Furthermore, the contract must provide a suitable security in the event of the developer's insolvency [56].

Under the German context, the participation of developers in the construction costs of the social infrastructure is currently limited to participation in the financing of day-care facilities and primary schools. A statutory amendment is currently under review as to whether other facilities should be included or the financial contribution should be raised. Either way, the total public value capture is limited to 2/3 of the increase in land value. If higher follow-up costs result, the surplus is to be financed using the municipal budget.

Similar to other countries, value capture instruments in England also enable planners to finance and provide public amenities that are vertically mixed with private amenities. Since the early 1990s, the main mechanism of capturing value for the public interest in England has been through developer contributions [57]. These contributions are made in accordance with section 106 of the Town and Country Planning Act 1990, or through the Community Infrastructure Levy (CIL) [58].

Both routes can help planners secure contributions to infrastructure, community facilities or public open space, all of which can be combined with private use of land. The National Planning Policy Framework (NPPF) in England stipulates that obligations of developers to provide public amenities should be kept to a minimum, applied only when essential and reasonable [59]. As in other countries, this brings to the fore the question of correlation between the proposed development and the required public infrastructure, and the availability of sufficient incentives for developers to sign agreements under Section 106. For example, the planners of the King's Cross regeneration project managed to link development to certain public amenities needed in the area. In particular, developer contributions were used to create floor space for two schools in the Plimsoll Building at King's Cross. These schools were incorporated into a residential building while at the same time alleviating some of the pressure on school development in London. The city procured these schools through a Section 106 agreement which shows how vertical allocations can provide a viable solution in dense urban environments, while enabling local government to become more responsive to fiscal and physical constraints [60].

Notably, while the contributions of developers under Section 106 are based solely on negotiations and there is no formula provided, the negotiation nevertheless relies on

a viability appraisal, which is a process of assessing whether a site is financially viable. This is done by looking at whether the value generated by a development is more than the Benchmark Land Value. The viability appraisal is a confidential document (not publicly available), which must be shared with the local authority for negotiation. If viability appraisals show that it is not financially viable for developers to afford the required public amenities, the type and scope of contributions will have to be negotiated between developer and local authority.

Compared to Section 106 agreements, the CIL route is allegedly more transparent. The developer's contribution is not based on negotiations. It is calculated per square meter using a formula and the developer makes cash payments to the local authority. The calculation involves multiplying the CIL charging rate by the net chargeable floor area (based on Gross Internal Area) and factoring in an index figure to allow for changes in building costs over time.

From these examples, it appears that it is possible to link value capture instruments to policies that increase the availability of floor space for use by the general public. Value capture can facilitate the vertical expansion of developable land [53], and encourage ancillary benefits such as the creation of a mixed-use city. Negotiated agreements, regulation, and land readjustment can promote vertically by providing public floorspace in high-rise developments. These instruments, however, bring about the nexus question between the city's requirements, the amenities needed, and the planning gains of the developer.

While some studies tie together vertical urbanism, value capture, and the provision of public floor space, few describe the regulatory and contractual mechanisms that facilitate the mixture of public and private amenities in a single location, let alone one building. With the exception of some countries like the US, Germany and England, the cogs in the value capture machine remain somewhat concealed. It is unclear how certain public utilities are produced in a mostly private surrounding. Moreover, it appears that each country, let alone city, has its own rules (if any) on where and how many public facilities should be provided in privately owned buildings. Where negotiations between public and private parties determine the extent of the produced value and value capture, they might result in random and individual solutions that sit "uneasily alongside the long-standing tradition of uniformity in land use planning" [61] (p. 86). Where regulations (not negotiations) set the rules of value capture, their nuts and bolts remain ambiguous too.

Given this knowledge gap, our aim here is to shed light on value capture arrangements that facilitate the placement of public floor space in private buildings in vertical settings. We will also analyze the rules and regulatory mechanisms that enable them and unpack their challenges and shortcomings.

3. Israel as a Case Study

In Israel, local governments use a variety of value capture tools, such as site-specific floor-area bonuses, and statutory land readjustment. Israel is an interesting case study that could serve as an inspiration to other countries because of its high growth rate, anticipated housing shortage, and scarcity of land that pushes the government to provide land for public utilities using a range of innovative tools. As such, it is an interesting example for countries facing similar challenges.

Allocations of public floor space in privately owned buildings in Israel can be based on agreements between developers and local government. On the face of it, these arrangements are not very different from developer agreements in the UK or joint development ventures in the US. However, the uniqueness of the Israeli case is that the possible cooperation between developers and municipalities is enshrined by law in local plans. In other words, this cooperation is part of the obligatory planning documents, equivalent to zoning ordinances in the US. In addition, although joint ventures between public and private bodies, public-private partnerships and similar contractual arrangements are frequently studied in the literature, there are few studies that explain how public and private cooperation results in public amenities placed (as floor area) within mostly privately owned structures, let

alone in a vertical surrounding. We fill in this gap too by looking at the Israeli case. Lastly, the Israeli case may be of interest to planners in countries with hierarchical, top-down planning systems. Indeed, vertical allocations in Israel were conceived locally and applied mostly in local statutes in the Tel Aviv metro area despite the fact that national statutes did not actually allow local governments to come up with such a solution. As we will demonstrate, vertical allocations as a subset of value capture solutions have not been fully institutionalized as a legal provision in the Israeli planning system. They have been implemented ad hoc by Israeli cities without a comprehensive regulatory framework. As such, the Israeli case is similar and relevant to transitional economies where "proper value capture mechanisms to finance public infrastructure are missing" [53] (p. 108). The investigation of vertical allocations is particularly relevant given calls by international institutions to improve the capacity of cities to raise public funds and improve the equity of public planning by providing public amenities through value capture [62,63].

4. Methodology

The study involved three-steps. First, we conducted a desktop-based inquiry into Israeli local land use plans that include vertical allocations. We searched the Israeli Planning Administration's archives using a keyword search for the terms "public floor space," "floor space," "pubic amenities," "exactions," and "public services." As a result, we identified 58 projects in Israel that included vertical allocations.

In the second step, we analyzed the local land use plans associated with these projects. These are site-specific plans at the plot, block, or the neighborhood level. They are often very detailed, specifying building rights, height, and land use. They also stipulate the obligations of developers and conditions for granting building permits. They are not agreements in the contractual sense, and they are not comprehensive plans either. Nevertheless, they are, in fact, a piece of local legislation, a statute approved by local or district planning commissions.

We reviewed the provisions of these plans, their embedded mechanisms and underlying characteristics including the deals they made between developers and the city. This review included the legislation and court rulings associated with certain projects, and supplementary material such as real-estate valuation documents and local plans' supplemental material.

To better understand the mechanisms, considerations and possible pitfalls of vertical allocations as a value capture tool, in the third step of our analysis, we interviewed dozens of professionals who are experts in the field of land use planning, law, real-estate appraisal, as well as public policy. We approached public officials in several municipalities, as well as experts who work with developers and landowners. Most of the interviews were taped and summarized. We obtained additional data through personal communication via phone or email correspondence. In addition, we initiated roundtable discussions with experts to flag key issues associated with vertical allocations (for a full list of personal communications see Appendix A).

We identified the informants in several ways. Following the first step of analysis, it became evident that vertical allocations are a frequent occurrence in the Tel Aviv metro area. Thus, we contacted planners in the district and local planning authorities in the Tel Aviv region. From there, we used a snowball interview technique to reach out to other professionals in the central government and the private sector who were involved in vertical value capture. We were also able to identify possible interviewees from studying the plans' documents and noting the professionals and developers who were involved in discussions on vertical allocations.

The interviews were semi-structured. We asked about the involvement of each informant in vertical allocations and the underlying reasons for using this tool. We also asked them whether they could think of similar projects we did not list and how the allocation actually worked in real life. Specifically, we inquired about the options for taking land (or floor space) for public amenities, and whether the practice fit the existing regulations. The answers we received enabled us to describe the mechanism of vertical allocations as well as alternative mechanisms, and to map their ability to capture value. We present a summary of these mechanisms in Table 1.

Table 1. Legal measures that enable vertical allocations.

Pathway and Its Outcome According to the Infographic Abstract	Consent-Based?	What Can Be Taken from the Property Owner?	Suitability for Vertical Allocations	Amount That Can Be Taken from the Owner	How Does the City Determine the Amount of Floor Space to Be Allocated?	Does the Developer Enjoy Density Bonuses?	Who Builds the Public Facilities After Land or Floor Space Is Allocated?	Who Finances the Construction of the Public Floor(s) or the Public Building?	Focus/Scope	Is There a Precondition That the City Owns Part of the Expropriated or Readjusted Parcel(s)?
Compulsory Expropriation Outcome: Option A.	No	Mostly land Floor space is rarely expropriated	In theory a city can expropriate a certain floor instead of land surface. The law, however, focuses on taking part of a given plot	Usually up to 40% of land surface can be taken without compensation. Above this threshold, the city would have to pay compensation	This mechanism is rarely used to allocate vertical floor space for public facilities.	No	The city	The city	1 parcel However, a few parcels can also be expropriated.	No
Land Readjustment Outcome: Options B or C	Yes	Land or floor space	Yes The law, however, does not deal directly with vertical allocations	40% of land surface without in-cash compensation If, instead of land, the city decides to take floor space- The Law does not prescribe how much floor space can be dedicated for public use.	Formula adopted by the city or through professional estimates.	Yes Otherwise city has to pay in-cash compensation.	Developer	Undetermined by law. Each local plan can create its own rule on the matter.	Several parcels	No
Compulsory Land Readjustment Outcome: Options B or C	No	Land or floor space	Yes The law, however, does not deal directly with vertical allocations	40% of land surface without in-cash compensation If, instead of land, the city decides to take floor space, the law does not prescribe how much floor space can be dedicated for public use	Formula adopted by the city or through professional estimates	Yes Otherwise city has to pay in-cash compensation	Developer	Undetermined by law. Each local plan can create its own rule on the matter.	Several parcels	No
Negotiated Agreement Outcome: Options B or C	Yes	Land or floor space	Yes	Based on mutual agreement	Bargaining	As agreed between the parties	As agreed between the parties	As agreed between the parties	Several parcels or one parcel	No

5. Findings and Discussion

Our survey identified 58 projects approved in recent years, most of which (93%) are located in municipalities in the Tel Aviv metro area, a central region in Israel that functions as a cultural and economic hub, and has higher land values compared to other regions. These projects are regulated by statutory plans approved in 2000–2017. In recent years, there has been a significant rise in the number of vertical allocation projects (Figure 1) most of which are located in the center of each city along main roads, primarily in areas where zoning allows high-rise development.

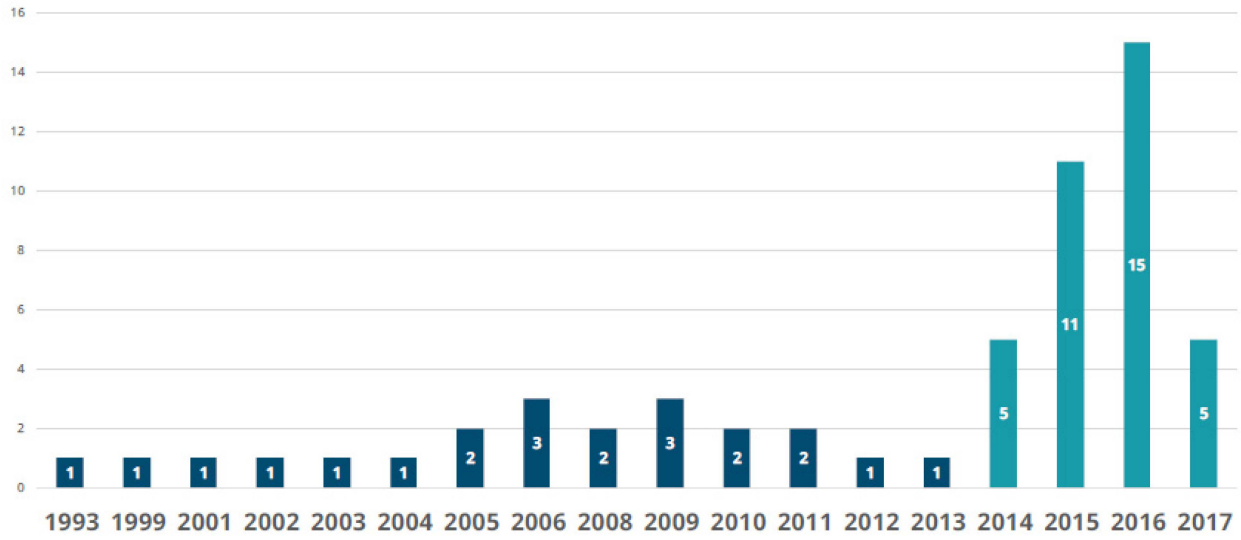

Figure 1. Number of vertical allocation plans sampled, by year (1993–2017). (n = 58).

Our expert informants suggested that vertical allocations by the city administrations are motivated by the desire to expedite urban renewal, accelerate private investment in public facilities, reduce public expenditures, and provide much needed facilities on-site or off-site. However, the legal mechanisms that create these public spaces in mixed-use development and the challenges they present remain understudied. We identified a sudden increase in the number of vertical allocations projects initiated in 2014–2017. Our informants explained that this happened because city administrations began to recognize the potential for the value uplift that could be captured through vertical allocations. To take advantage of this opportunity, they had to perfect the administrative and legal mechanisms (contracts, training personnel) that enabled the provision of public floor space in vertical environs. No less importantly, these years witnessed a steady rise in urban renewal projects in inner cities, and planners needed to create new spaces in these dense urban areas. The scarcity of land made them think about locating public spaces vertically.

5.1. Mechanisms for Vertical Value Capture

What are the regulatory pathways to ensure vertical allocations? Which value capture instruments are used for these purposes, and how? The data elicited from existing regulations and local plans in Israel indicate that there are several options for allocating floor space for public services. The first is the allocation of actual land area within a given plot. The municipal authority may take up to 40% of the land surface for certain public uses without compensation. Second, the city can require developers to cede floor space in a building that is being constructed. The latter option entails vertical allocation of one floor or more for use *by the project and the nearby community* (see Figure 2). The third option is to require developers to allocate floor space for public amenities in a particular development, which will serve the project, the neighborhood, and also *the city as a whole.* In some cases, and according to the third option, the city may require developers to cede floor space for future (undetermined) use (see Figure 2).

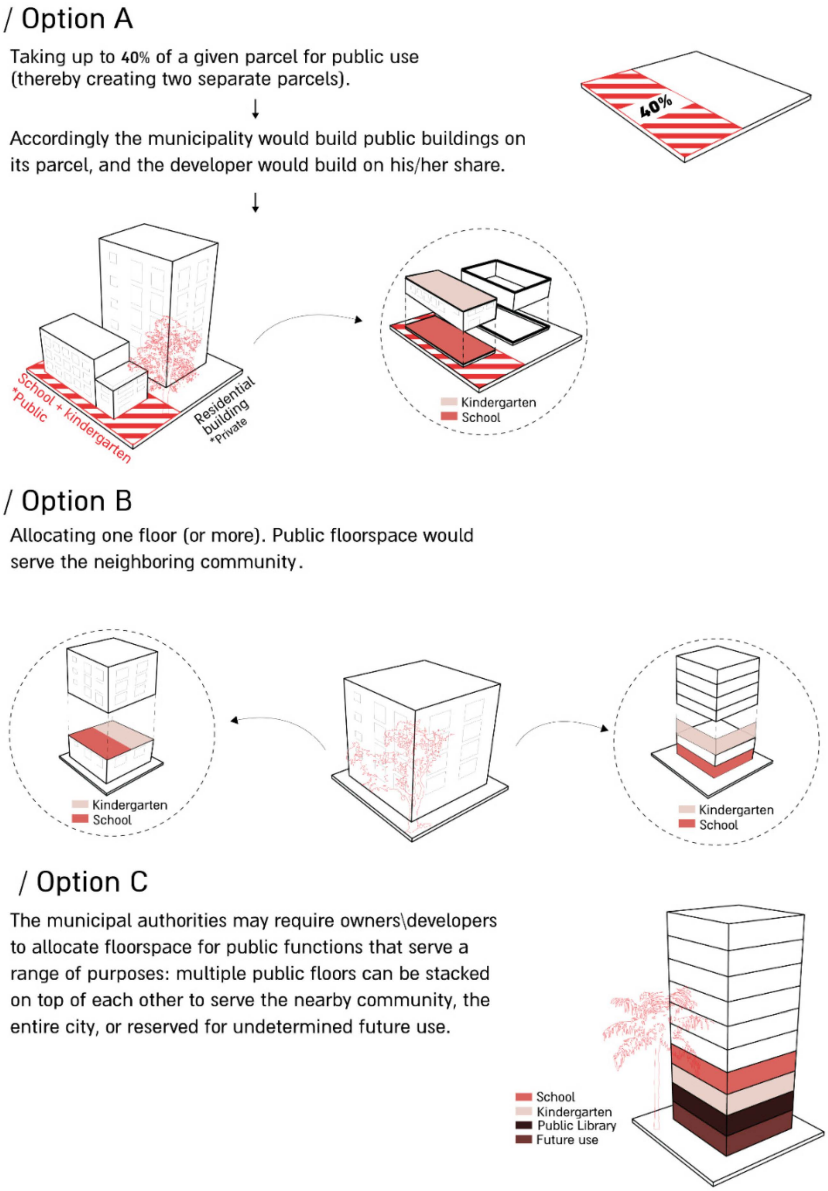

Figure 2. Infographic abstract: Pathways for the vertical allocation of public floor space.

At first glance, these pathways suggest that the city has discretion in determining the type of use, the number of floors, and the potential users of public floor space. However, we found that this discretion leads to friction between developers and the city. Moreover, local practices of vertical allocations are quite complex and face quite a few challenges (see Section 5.2). Current regulations relate only to exacting or expropriating parcels (land surface). The law remains silent with respect to the ability of cities to take land vertically. This lacuna has encouraged cities to adopt and formulate local solutions and guidelines that enable vertical allocations.

As for the legal and statutory mechanisms that enable vertical allocations, we found that Israeli cities use several tools to capture value in vertical settings (Table 1). The analysis of local legislation and our interviewees shed light on the different regulatory routes. They differ in terms of the coercion level they involve, the amount of space provided for public services, and the secured financial means. The most coercive route is expropriation, while the least coercive or intrusive is the negotiated agreement.

Most of the vertical allocations we examined occurred through land readjustment or negotiated exactions. Although formally, and in accordance with the Israeli Planning

and Building Act, cities can expropriate land and floor space, they refrain from using this option. Instead, city planners prefer to use land readjustment and negotiations. This way, cities avoid in-cash compensation, and save money for the taxpayer. In this manner, city officials argue, the city ensures the provision of public amenities that are inserted into the built fabric in privately owned structures. The developer retains ownership over most of the floors, while the city receives title to the one or more floors that are dedicated to public use.

This mechanism assumes that there is a local (statutory) plan that enables mixed-use development. The plan is generally backed by a written contract or an implicit agreement between the owner and the city. At other times, the plan obligates owners to provide floor space to the city, or else planning approval will not be granted. Our informants indicated that there are several underlying assumptions embedded in vertical allocations. First, the city can provide density bonuses to mitigate the costs of constructing the public facilities. This assumption is based on the understanding that proposed development creates value uplift that can be harnessed, at least in part, to afford these public goods. Second, the city can establish a nexus between the proposed development and its requirement for public floor space (see Section 5.3 infra).

Table 1 shows that vertical allocations can be created using a range of value capture mechanisms through negotiated or compulsory measures. The latter are used when the city and the owner or developer of the parcel cannot agree on the contents and the stipulations of the local plan. The analysis also suggests that existing Israeli regulations are overly simplistic and outdated. They did not foresee the need for cities to take land vertically. Although they allow cities to allocate up to 40% of a given land area for certain public facilities without compensating the owner, they do not deal with the issue of allocating floor space. In other words, Israeli law assumes that land for public facilities can be taken primarily by allocating land space, not vertical floor space, within multi-floor buildings. As such, the law does not suit many urban projects that rely on the densification of the existing urban fabric. Given this lacuna, Israeli cities have developed local plans that determined ad hoc vertical allocations of public floor space.

This ad hoc solution has created numerous challenges to cities. Given that they are forced to operate in a legal limbo, these cities relied on legal advice, professional estimates, guidelines and municipal formulas to justify the number of square feet allocated in each project. Gradually, developers and owners became unhappy and argued against what they regarded as a lack of transparency and the arbitrariness of vertical allocations requirements.

5.2. Growing Critiques of Vertical Allocations

Value capture regulations that allow for vertical allocations create quite a few challenges. In this section we explain the increasing critiques of vertical allocations and how city governments have attempted to address them.

Existing regulations gave way to plans inclusive of vertical allocations that appeared quite random. They varied in terms of the size of the allocation as well as other stipulations embedded in local statutes. While some projects included a relatively large portion of floor space for public services, others included a small share of allocation. For example, in the Tel Aviv metro area there are plans that exact 2160 square meters, while others require only 300 square meters for a range of public utilities (Figure 3). The size of the allocation is determined by the city's planning department, following negotiations with developers or a strategic planning assessment that provides an estimate regarding the needed public space that would serve the new development. As Table 1 notes, at other times the city compels owners and developers to allocate this floor space against their will, thereby passing local plans without consent.

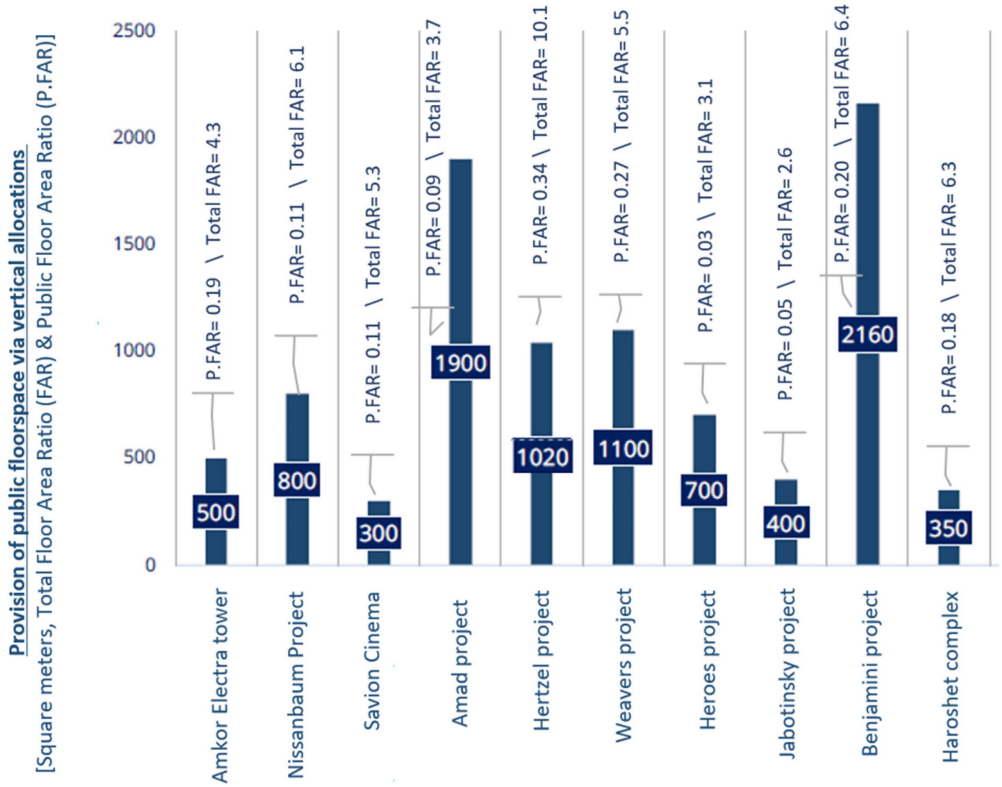

Figure 3. A sample of local plans that include vertical allocations in the Tel Aviv metro area.

Figure 3 presents examples of the resulting total built-up floor space in relation to the building's plot area (floor area ratio) as well as the total public floor space in relation to the plot area (public floor area ratio). The data suggest that there are no uniform rules for allocations across projects and local jurisdictions. Moreover, the share of public vertical allocations is not directly linked to the total floor area in each building. While in some cases cities are able to extract more floor space, in other cases, the share of public floor area out of the total floor area is not significant. Thus, it is safe to say that the developer's contribution of public floor space is marginal relative to the entire bulk of each project. When coupled with density bonuses, it becomes evident that vertical allocations do not create unnecessary financial burdens. Indeed, the planning apparatus of vertical allocations makes it possible to reap value uplifts to provide these spaces.

Having said that, the exact size of the allocated space, however, appears is some cases to be quite random, as it is the result of several factors. The interviews we conducted suggest that the reasons for the different allocations are tied to a variety of factors. These factors include increasing the value for the developer in a given local plan using different density bonuses, structural and layout limitations of the plot, the need for a certain type and/or size of a public utility, the power of the city to negotiate local contributions, the willingness of the developer to cooperate, and the city's ability to establish a direct link between the proposed project and the specific needs of the community and the city. For these reasons, most city administrations have not established a uniform rule for vertical allocations.

The arbitrariness of local policies of allocation has led to criticism from private owners on whose property the government sought to allocate floor space for public utilities. In addition, the national Ministry of Justice has scrutinized cities for their inconsistencies and lack of transparency in allocating public floor space.

Attempting to remedy the situation, the largest municipality in Tel Aviv's metro area (Tel Aviv-Jaffa) has adopted a uniform formula, designed to clarify how much floor space it would require. The formula is tied to the number of dwelling units or commercial floor space the developer proposes to build. In addition, to address these concerns, cities have become more aware of the need to give owners and developers assurances regarding the

specific use of floor space allocated for public amenities. For example, developers have required the city to clarify up-front (through an agreement or in local statutes) what types of public land-uses it would allow in the exacted floor space. They feared that floor space would be allocated for uses incompatible with their planned development, or that public floor space would depreciate the value of the land or make marketing a challenge. They argued that having a public daycare facility is different than having a public funeral home or offices for treating drug addicts. Indeed, our findings suggest that most land-use plans (66%) were quite specific in determining the public use of vertical allocations. Moreover, these plans were quite inflexible in allowing city administrations to change the use of allocated floor space (Figure 4).

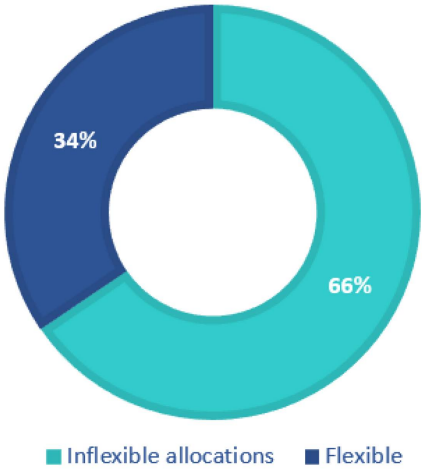

Figure 4. The flexibility of the use of public floor space in local plans inclusive of vertical allocations.

Having said that, our analysis suggests that vertical allocations did not always meet the expectations of their critics. While developers often argue that cities should cover the costs of constructing the public floors, city officials assert that the costs should be borne by the owners and developers. The benefits that accrue to owners as a result of developing land far outweigh the costs of constructing public floor space, and thus the city does not need to pay even a share of the costs. According to this argument, if, for example, a developer builds a new high-rise with 100 new apartments, the development may create excess demand for schools and other public facilities to support the incoming population. Why then, city officials ask, should the public at large bear the costs of buying land and constructing these public institutions? These debates continue to plague the practice of vertical allocations, and to add to the tensions and unfriendly exchanges between cities and developers.

Specifically, the latter argue that city administrations deliberately omit the issue of covering the costs of construction from land use plans. Some local plans were silent or quite vague regarding the question of who shall pay for building the public floor space required by the cities. While developers argued that these costs should be borne by the city administrations, the latter opined that these costs are externalities that should be paid by the developers, as a marginal cost of the entire development. Consequently, local planners who drafted these plans stipulated this requirement in the plans' provisions, or were silent or vague about it, thereby deliberately omitting any reference to who pays for these floors (Figure 5). As a result, the debate was left for future negotiations between the city and the developer at a later phase. This approach can be problematic, because when the parties do not reach an agreement, vertical allocations might just remain on paper.

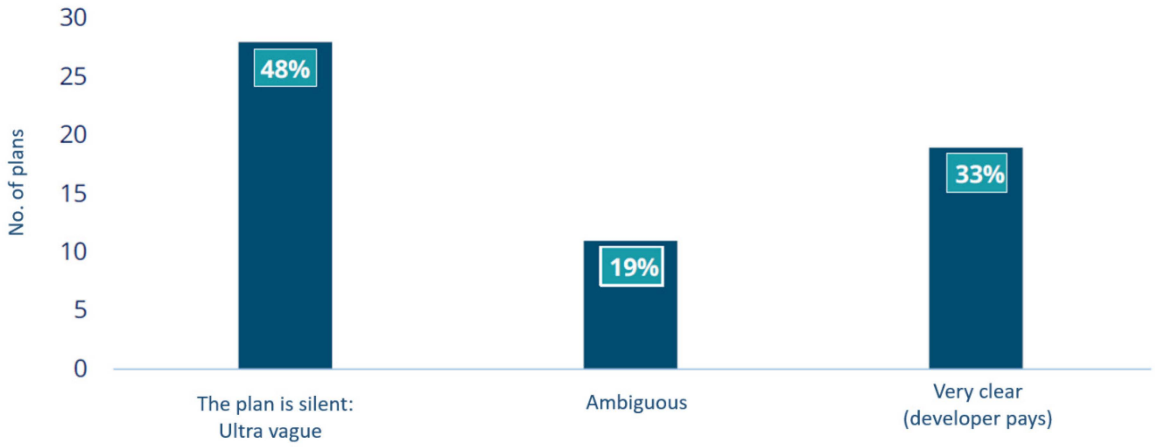

Figure 5. Who pays for the construction of public floors?—Analysis of statutory provisions.

Another problem associated with vertical allocations relates to cases where the allocated public floor space replaces land area owned by the city. We found that in more than half of the vertical allocations cases, the municipality used to own land before the approval of the plan. The city gives its land and agrees to a new land use plan, which includes mixed-use development. Municipal plots and privately owned parcels are joined together, usually through land readjustment. In fact, municipal land is "reshuffled" with a pool of existing plots, and comes out as floor space. In this manner, while adding density bonuses, Israeli cities capture value while ceding control of public land to private developers through an outright sale, with the condition that public space be integrated into the new building. Municipal land is sold to the developer and then re-sold to the city as floor space.

This practice involves challenges and pitfalls. First, relative to other owners, the value of municipal land before and after the allocation should be the same as the value of privately owned floor space. Second, critics we interviewed argue that the allocation of public floor space in developments on previously public land is wrong because the city should not give away land in exchange for vertically allocated floors that will serve a particular developer. Instead, according to the critique, to avoid accusations of misconduct and discrimination, the city should offer its land to the highest bidder in order to maximize its value.

Despite these challenges, it appears that vertical allocations are no different than other policies adopted by cities around the globe to expedite renewal. In fact, writing about the South African experience, Santos et al. [64] (2017) find that:

Another case where a municipality may wish to contribute its land as an in-kind payment is when the land is adjacent to a privately owned site and the public and private sites can be combined as one regeneration project. Rather than put a city-owned property up for bid for redevelopment by itself, it may be more beneficial to seek the adjacent property owner as a development partner. The municipality does not necessarily have to forego the value of the city-owned site if there are few development constraints and the municipality is able to get market value for the property (p. 53).

5.3. The Nexus Question and Vertical Allocations

There are several other potential frictions between developers and the municipalities. The first deals with the area served by the proposed public allocation. Some cities demand public floor space that will serve the project and its vicinity (neighborhood-level amenities). Other cities, however, require developers to supply public spaces for use by the whole city (such as a city library). Their estimates are based on professional opinion or a formula adopted by the city in accordance with its guidelines. A formula calculates the floor space a developer would have to provide for public use based on the number of added housing units or the floor space that is added by the developer for other, non-residential use. Overall, the estimates are based on municipal planners' calculations of the incremental

needs for public facilities associated with the proposed development. Having said that, we found that developers regard Tel Aviv-Jaffa's formula as complex, exposing them to some uncertainty. We also discovered that some municipalities do not use written formulas that are transparent and known to developers in advance. This is not an unusual practice internationally, as some cities around the globe have avoided the use of formulas to extract public benefits under the framework of value capture [28]. As a result, developers frequently question the tie between the required public floor space and the actual needs of the city, the neighborhood, or a specific project. This issue, also known to international readers as the nexus question, is a recurring theme in the value capture scholarship. The Israeli case provides further evidence on this matter. The vertical environment in which public floor space is exacted adds a new dimension to this question, as the tie between private and public amenities become quite evident and even inseparable.

Some vertical allocations are designed to supply public services for the city as a whole. These requirements might be weakly linked to the project in which public floor space has been allocated. One example is when a developer applies for a building permit to construct an office building, and the city requires him/her to allocate one floor for use by the general public (for example, setting aside floor space for a municipal library). In these cases, the allocation of floor space does not directly benefit the development. The library does not serve the users of the proposed office building directly (or solely), though it can create both positive and negative externalities. Instead, it is required as a contribution towards a new amenity that serves residents throughout the municipal area. Indeed, Israeli cities are not alone in dealing with nexus issues, which are comparable to the British experience with community infrastructure levies [29] (p. 76) or the American experience with municipal requirements for off-site amenities [40].

Consequently, we found that vertical allocations create a tenuous relationship between the city and the developer, and between the incentive the city offers and the required amenity. While some amenities inside mixed-use buildings can create a reasonable collection of land uses (such as a community center below a residential building), the introduction of amenities that are regarded as unrelated to the development may stall the project and its implementation. This is especially true in cases of vertical allocations, where unrelated amenities have a greater impact on development. For example, Tel Aviv-Jaffa requires space for municipal offices located in buildings that host privately owned offices. The allocation of municipal offices might reduce the value of other offices, for example, when municipal offices are used for social services such as to help alcoholics. Moreover, the city may find it hard to convince owners or developers that the required municipal offices are related to the proposed development, and that there is a direct need to provide municipal offices that stems from the construction of private offices.

The nexus problem is also accentuated by looking at the land uses embedded in existing plans, and their relationship with the required public floor space. Developers opine that the need for most public floor space (for example, schools) is dependent on residential development and additional housing units. We found that developers argue that the need for public floor area in a given project can be extracted and justified only by linking each public allocation of built-up space to private floor space and, specifically, to apartments. This is because apartments increase population density, which can place more demands on nearby public spaces. Cities, however, argue that the requirement for public floors can also stem from other types of development, including projects that contain the non-residential use of land. This is why we found that cities have approved public floor space in a range of local plans, each of which includes a mixture of a variety of land uses in the same building (Figure 6). Thus, vertical allocations are not pegged to residential zoning alone. Having said that, being aware of this critique, it still appears that most local plans require public floor space in buildings that contain residential use (Figure 6). Put differently, in practice, vertical allocations are approved where it is easier to create a nexus between the public demand and the private amenity.

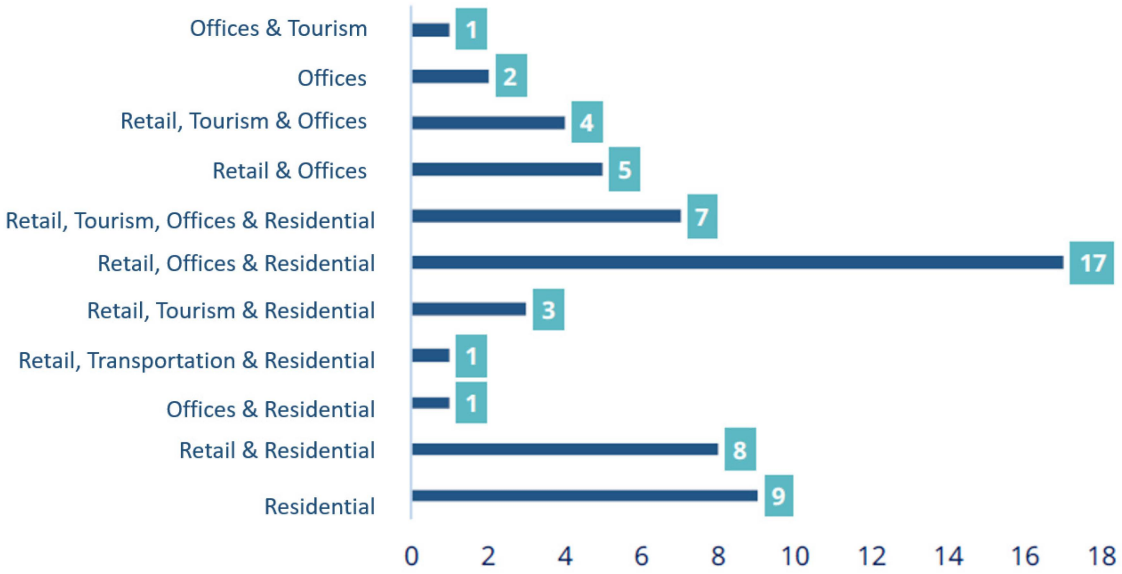

Figure 6. Number of local plans, sorted by type of private uses mixed with public floor space (n = 58).

The question of "relatedness" is as complex when certain requirements for vertical allocations are designed to mitigate the effects of other projects in the nearby neighborhood. Here, the nexus question touches on the mitigation of externalities as well as on considerations of social justice and fairness. One example is when a developer builds new apartments and is therefore required to set aside floor space for kindergartens that would serve the proposed project as well as a nearby development that had not previously provided public floor space. In these circumstances, the city faces criticism (and legal challenges), with developers arguing that they should not bear the brunt of the costs by providing floor space that should have been provided by other developers in the vicinity.

These issues become more contentious when vertical allocations are set per project, and not according to predetermined formulas or strategic planning. No other Israeli city (except Tel Aviv) uses a formula that is based on professional assessments. Even with a formula, developers argue that its application is unclear or flawed. Furthermore, developers claim that the incentives received (or offered) by cities do not correspond with appraisals of the development's viability. In addition, they maintain that the city planners' analysis of the financial viability does not correspond with the real costs of developing public floors or the actual needs of the city. As a result, the requirements that the cities say they need are regarded as rather capricious. This argument is not unique to Israel, as international experience shows that assessments about financial viability are often questioned despite their technocratic aura [65].

6. Conclusions

This paper brings to the fore the ability of value capture to create vertical solutions in an urbanizing environment. The link between value capture and vertical development has not been sufficiently established by the existing literature, let alone its ability to bring together public and private amenities within the same project. It is our hope that the Israeli case can open the door for future research on this matter, which explores the mechanisms used across jurisdictions to create mixed public-private floors in the same project, as well as the challenges associated with this policy.

The ability of local government to sustain itself in the long run, to form strategic partnerships or to implement policies that save government funds, provide critical services, and improve amenity- all contribute to achieving sustainable urban governance. This is achieved through vertical allocations as an attractive strategy for reducing acquisition costs for public land. Vertical allocations are useful for deriving additional investment, especially in high-growth areas, where land values are relatively high. They work best

in situations where the private development generates sufficient profit and value uplift that can be reaped in whole or in part by the city. Vertical allocations often entail density bonuses, which developers may or may not accept. Some allocations are determined without consent, while others occur through public-private cooperation. Either way, as the size of population increases in urban areas and land becomes scarce and more expensive, planning has largely been about reducing development pressures, and supplying public facilities and infrastructure in the urban core. Vertical allocations, together with other value capture tools, have been harnessed to achieve these goals.

Although Israeli cities have experimented with vertical allocations, they have not always managed to block complaints coming from owners and developers. A key problem has been the lack of overarching legislation that empowers cities, creates transparency, spells out the conditions that allow vertical exactions, and facilitates the forfeiture of city plots in exchange for floor space. The missing regulatory framework poses quite a challenge in the context of value capture [53,66]. On one hand, the regulatory void creates room for local practices and rules, such as the ones created by some Israeli cities. On the other hand, it might lead to controversies. As we demonstrated, a vertical allocations program that leaves developers unaware of the long-term use of public floor space can cause discontent. A vertical allocation policy that is unclear, leaves room for negotiations, and does not assign roles and responsibilities could antagonize owners. In a similar vein, vertical allocations that do not address the nexus question can lead to disputes. Allegedly, in vertical settings, it is easier to link public and private floor space, and to assign the public use of certain floors to private needs in the same project. However, the Israeli case demonstrates that even within site-specific projects, the nexus question has still many tentacles. It rears its head because of the city's aspiration to create more value for the public by linking private initiatives to citywide needs. Better policies should therefore not only stress transparency and accuracy, but also linkage: between a particular project and the required floor space; between a given project and externalities; between profit and public exactions; and between value creation and value capture.

Despite this and other caveats, city administrations in Israel have been able to establish their own practice by using a range of value capture tools to shift a larger share of public costs to private developers. As such, vertical allocations are an alternative source for the capital financing of new public facilities. Today they are used to secure a range of other goals as well, such as mixed-use projects, compact development, and the creation of urban spaces that bring public amenities closer to private users. These benefits, however, are dependent on harnessing the market, and on developmental logic. In areas where there is no marketable land, or where land cannot generate value uplift, this collaboration between public and private actors cannot take place. Cities that rely on entrepreneurial urban governance arrangements may benefit from vertical allocations. Local governments across the globe that lack financial resources and the revenues to provide public infrastructure and facilities might want to consider the Israeli case (with its pros and cons) when devising their own policies and regulations.

Author Contributions: Conceptualization, N.M., A.H., V.M. and E.S.; methodology, N.M. and E.S.; validation, N.M. and E.S.; formal analysis, N.M., A.H., V.M. and E.S.; investigation, N.M., A.H., V.M. and E.S.; resources, N.M., A.H., V.M. and E.S.; writing—original draft preparation, N.M., A.H., V.M. and E.S.; writing—review and editing, N.M.; visualization, N.M.; supervision, N.M.; project administration, N.M.; funding acquisition, N.M., A.H. and V.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received external funding.

Institutional Review Board Statement: Not Applicable.

Informed Consent Statement: Not Applicable.

Data Availability Statement: Data is contained within the article. The data presented in this study are also available in the full Hebrew publication on Vertical Allocations, which can be found here: VERTICAL EXPROPRIATIONS (Hebrew version) (researchgate.net, accessed on 8 March 2021).

Acknowledgments: This research was supported by the Israel Science Foundation (grant No. 2251/20) and COST (European Cooperation in Science and Technology) Action PuVaCa No. CA17125.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. List of Interviews and Personal Communications

1. Interview with an urban planner. City Planning Department, & Engineering Administration, Tel Aviv-Jaffa Municipality. 16 March 2017.
2. Interview with a (second) urban planner. City Planning Department. Tel Aviv-Jaffa Municipality. 16 March 2017.
3. Interview with a (third) urban planner. City Planning Department. Tel Aviv-Jaffa Municipality. 16 March 2017.
4. Interview with a consultant and planner, Tel Aviv District Planning and Building Committee. 16 March 2017.
5. Interview with senior legal consultant, Haifa metro area. 24 April 2017.
6. Interview with a senior financial consultant in a local municipality, Gush Dan Area, 24 April 2017.
7. City planner and planning consultant in the city of Bnei Brak. 24 April 2017.
8. Interview with senior planner in Petah Tiqwa municipality. 1 May 2017.
9. Interview with a senior financial consultant in a local municipality, Gush Dan Area, 9 May 2017.
10. A telephone conversation with a senior legal advisor in a local municipality in the Gush Dan Area. 14 May 2017.
11. Interview with a municipal planner, Tel Aviv-Jaffa Municipality, 24 May 2017.
12. Interview with a Deputy Mayor in a city located in Gush Dan Area 2 July 2017.
13. A telephone conversation with a senior planner, Bat Yam Municipality. 26 July 2017.
14. A telephone conversation with a city planner, working in a private planning office. 1 August 2017.
15. Interview with the Director of the Senior Division of the Ministry of Education. 17 August 2017.
16. A telephone conversation with a senior planner, Tel Aviv-Jaffa Municipality 10 September 2017.
17. Interview with a senior real estate expert, Ramat Gan Municipality, 24 October 2017.
18. Interview with architect in city planning department, Ramat Gan municipality. 24 October 2017.
19. Interview with an architect in the city planning department, the municipality of Beit Shemesh. 29 November 2017.
20. A telephone conversation with a senior appraiser. 14 December 2017.
21. Interview with a senior appraiser. 3 January 2018.
22. Interview with a senior appraiser representing entrepreneurs in urban renewal projects. 3 January 2018.
23. Interview with a senior manager in the city's property department in the center of the country. 16 January 2018.
24. A telephone conversation with a senior legal adviser in a government ministry. 31 January 2018.
25. Roundtable discussion on vertical allocations with the following experts: Senior legal advisor in Tel Aviv's planning commission, an expert real estate appraiser, and a municipal planner working for a municipality in Tel Aviv metro area. 4 February 2018.
26. A telephone conversation with a law professor, Israeli college of management. 8 August 2018.
27. Roundtable discussion on vertical allocations with several experts; Senior planner (retired) in Tel Aviv's District Planning Committee; senior real-estate appraiser in

the Israeli Ministry of Justice; the deputy president of Israel's Builders Association; head of a municipal real-estate department in a municipality in Tel Aviv metro area. 15 December 2019.

28. E-mail correspondence with a real-estate appraiser who was involved in a vertical allocations project. 17 December 2019.

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