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## **EDUCATIONAL NOTE**

# **An Educational Note Using Rules of the Game in the Built Environment: Teaching Institutions and Incentives with Economic Mysteries**

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### **Abstract**

This educational note explores how economic institutions, specifically changes in the rules of the game for taxation, have influenced incentives surrounding the built environment. It provides intriguing examples from around the globe, such as medieval jettifying, Amsterdam's narrow buildings, unfinished buildings in Cairo, the French mansard roof, and the British window tax, which were all shaped by economic incentives. It uses the economic-mysteries pedagogical technique. Additionally, it includes a brief background for instructors on how institutions affect an economy, referring to the prominent economists Douglass North, Ronald Coase, and Elinor Ostrom. These examples illustrate the profound effects of economic principles on architecture and society, emphasizing the importance of understanding how institutions and incentives work in the real world.

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### **I. Introduction**

Economics shapes the world in which we live, work, and play. Economic principles and theories function as an invisible yet powerful architect that crafts and builds the environment around us. For economics instructors, the relevance of our discipline to everyday life

often feels intuitive. For example, we readily understand how economic institutions, the rules of the game, provide a framework of incentives that influences behavior and decision-making, sometimes with tremendous and far-reaching effects. As instructors, we generally find it easy to see the influence of economics since it is pervasive and essentially everywhere.

In contrast, most students regularly question whether economics has any relevance whatsoever to the wide variety of phenomena they observe in the world around them. They are skeptical of the claim that economics has an impact on their life and struggle with seeing economics at work in real life. Students, and likely other non-economists, regularly consider economics as being limited to topics like the stock market and unemployment or as simply being all about money. The combination of perceived irrelevance or limited scope of economics with general skepticism about the influence of something not easily seen makes it difficult for students to connect abstract economic theories and principles from the classroom to concrete examples and applications in the real world.

In this educational note, we provide a set of examples that instructors can use to help convey the power of economics to their students. Our focus is on illustrating economics in action by using real-world, tangible examples from the *built environment*. The built environment refers to everything in our human-constructed surroundings where people live, work, and interact and stands in contrast to the natural environment. It encompasses all the “products and processes of human creation” and “emerges from human needs, thoughts, and actions” (Bartuska 2007, p. 3).

The provided set of carefully curated vignettes of economics in action is designed to help instructors demonstrate how slight changes to economic institutions alter incentives and influence decision-making. This results in outcomes students can easily see in the built environment. These interesting, relevant, easy-to-use examples focused on a common theme are intended to lower costs to instructors who want to help make the role of economics more visible for their students.

## **II. Essential Background and Definitions**

When institutions, incentives, and other key concepts are first introduced to students the economic terminology often encompasses such a wide swath of concepts and ideas that it can be confusing and overwhelming. In this section, we provide essential background and

definitions as a common reference guide for instructors. It may be particularly helpful to briefly introduce students to three key contributors to the history of economic thought surrounding these topics: Ronald Coase, Douglass North, and Elinor Ostrom.

#### *Ronald Coase*

Ronald Coase's work from the 1930s to 1960s introduced the influence of transaction costs and property rights on the efficiency of market outcomes. The debate between proponents of laissez-faire policies and those favoring government intervention revolves around defining the optimal rules for market functioning. In 1991, Coase was awarded the Nobel Prize in Economic Sciences "for his discovery and clarification of the significance of transaction costs and property rights for the institutional structure and functioning of the economy" (NobelPrize.org 1991). Students should note that Coase laid the groundwork for studying institutions through the lens of economics and shed light on how the institutional structure of the economy can be explained by the relative costs of different institutional arrangements, combined with parties' efforts to keep total costs at a minimum in his article "The Problem of Social Cost" (1960).

#### *Douglass North*

Economic historian Douglass North's work from 1960 to 1990, along with his seminal book *Institutions, Institutional Change and Economic Performance*, provides a modern definition of institutions and emphasizes their influence on society. He writes, "Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic. Institutional change shapes the way societies evolve through time and hence is the key to understanding historical change" (p. 3).

When we use the shorthand term *rules of the game*, we are referring to the overall institutional framework, regulations, laws, and social norms that shape economic behavior and interactions within a society. These rules establish the boundaries and incentives that guide individuals and firms in their economic activities. In 1993, Douglass North and Robert W. Fogel jointly received the Nobel Prize in Economic Sciences "for having renewed research in economic history by applying economic theory and quantitative methods in order to explain economic and institutional change" (NobelPrize.org 1993).

North-inspired economic institutionalists have continued to highlight how the evolution of formal and informal institutions affect economic growth and outcomes and emphasize the role of property rights, contracts, and enforcement mechanisms as fundamental rules that underpin market transactions.

### *Elinor Ostrom*

In 2009, Elinor Ostrom was awarded the Nobel Prize in Economic Sciences “for her analysis of economic governance, especially the commons” alongside Oliver E. Williamson “for his analysis of economic governance, especially the boundaries of the firm” (NobelPrize.org 2009). Ostrom was the first woman to win the Nobel Prize in Economic Sciences, and her research on common-pool resources and governance highlighted the importance of informal rules and social norms in resource management. Ostrom’s work from the 1950s to 1990s emphasized how community-based rules and trust contribute to sustainable resource use. This perspective underscores the role of cultural norms and social capital in shaping economic behavior (Ostrom 1990).

This brief introduction to the development of ideas from key figures in the history of economic thought helps prepare students to view examples from the built environment and consider how they relate to the concepts of institutions and incentives. We use the stories of the Nobel Prize winners to emphasize how economic ideas are developed over time. This helps prime students to understand how institutions influence decision-making.

### **III. Pedagogical Technique and the Economic Way of Thinking**

In this section we review the pedagogical techniques that will be used and give background on the economic way of thinking, which will serve as the framework for the economic principles we will be teaching.

Economic education is still a relatively young field of study, and it has continued to evolve over the last fifty years, moving marginally away from “talk and chalk” lectures to more active learning techniques (Fernandez et al. 2021). Economics instructors at all levels look for ways to engage their students, help them connect theory to applications, and develop examples that are timely and relevant (Wooten et al. 2021). The balancing act for today’s economic educator is to find ways to invigorate their traditional methods and

differentiate instruction while simultaneously minimizing the costs to adopting new techniques (Al-Bahrani et al. 2016a).

In this paper, we use a simplified version of question-driven instruction made popular in the sciences as a method that supports active learning in a student-centered environment (Beatty et al. 2006). This instructional technique is similar to a scaled-down Socratic dialogue (Sheflin 2008) and presents the students with a question or mystery. The mystery pedagogy is a method used in precollege lessons that invites students to solve puzzles or answer questions with economic reasoning (Schug and Western 1994; Schug and Western 2000a; Schug and Western 2000b). Question-driven instruction gives time for the instructor to engage with a variety of student responses and guide students to discover answers that connect with economic theories, principles, or concepts. In short, we are leveraging curiosity-driven questioning to motivate scientific thinking and learning, using students' natural motivation to fill a knowledge gap (Jirout 2020), and filling that gap with economic reasoning.

The procedure is relatively simple and can be completed with or without the use of instructional technology and is easily adapted to small or large class sizes. The question and response time can be very brief or expanded based on the amount of time available and student interest. The handout provided in appendix A could also be used as an opening or closing exercise or given as a take-home assignment. Each image and accompanying narrative can be used individually or presented as a group and follow this general sequence:

1. The instructor proposes a question or series of questions for students to consider. We recommend displaying the question along with a visual image.
2. Then the instructor and students engage as they respond to the question. This can occur as an open discussion with or without the use of polling or response technology, or it can be organized as a think-pair-share, a snowball (increasingly large pairing/sharing groups), or a full class discussion (Gonzalez 2015).
3. The instructor reveals the final, more formal answer, which includes historical data for context and a direct connection to the economic concept(s).

Economic educators have also developed a way of looking at the foundational principles of economic reasoning, which are

colloquially referred to as the economic way of thinking. They have been summarized in a variety of forms, including the “Twelve Key Elements of Economics” (Gwartney et al. 2016), the “Handy Dandy Guide to Economic Thinking” (Council on Economic Education 2020), and “The Economic Way of Thinking: Economic Reasoning Propositions” (Foundation for Teaching Economics 2024). University-level economics textbooks have similar summaries in their first chapters (see Gwartney et al. 2022 and Heyne et al. 2006 for examples) or supplemental text (Arnold 2005). The same guiding principles often also appear in curricular materials designed for K-12 students, particularly high school students (Bosshardt et al. 2009; Wentworth and Schug 1994; Schug, Caldwell, and Ferrarini 2006).

The economic way of thinking is a lens through which to view the world. It has been used to gain insight into fields as diverse as the environment (Arora et al. 2003) and US history, civics, and government (Schug et al. 2019; Niederjohn et al. 2022). Scholars have also developed empirical experiments and studies that investigate whether the economic way of thinking is a productive method for teaching economics to young people and other groups (Niederjohn, Schug, and Wood 2013; Schug, Niederjohn, and Wood 2021).

Regardless of the primary source used, there are two economic principles that are especially relevant for students to understand at the conclusion of this exercise:

1. *People respond to incentives in predictable ways.* Choices are influenced by incentives. Incentives are actions or rewards that encourage people to act. When incentives change, people’s behavior changes in predictable ways.
2. *People create economic systems that influence individual choices and incentives.* How people cooperate is governed by written and unwritten rules. As rules change, incentives change and behavior changes. Institutions are the rules of the game that influence choices.

Overall, students may be fine with the idea that incentives matter since they regularly see it in their own lives. However, they tend to underestimate the power of human creativity unleashed when incentives get embodied in the rules of the game. They may recognize that incentives play a role in motivating individuals to act in certain ways based on their personal experiences yet simultaneously underestimate the extent to which incentives can shape behavior on a larger scale. For example, students might understand that receiving a

financial reward for achieving good grades can motivate them to study harder. However, they may not fully grasp how incentives at play in the world of college choice may be affecting the design and architecture decisions found on their own college campus (Hunter 2022). Given the visibility and relative permanence of the built environment that surrounds students, their eyes can be opened to the power of economic principles—specifically institutions and incentives—by using the examples we provide in the section that follows.

#### **IV. Examples from the Built Environment**

Each example from the built environment includes a prompt, an image, descriptive text that provides background and context packaged together within the answer, and an explicit economics connection. The use of images along with real-world examples is designed to help students recall the concepts and information. It provides them with an anchor or concrete example to ground the principles and theories they are learning (Acchiardo et al. 2017; Holder et al. 2017; Al-Bahrani et al. 2016b). By sharing examples that stick with students' past examination time they can retain the economic way of thinking to carry with them as a guiding principle in the future.

The prompts and accompanying images can be introduced individually or grouped by displaying a few of the images in sequence and asking students the questions as a series. Alternatively, the questions and images can be used as an opening or closing exercise or as an external assignment to allow students a chance to reflect and respond privately.

Finally, because elements of the built environment (buildings, greenspaces, offices, and so on) do not move around they are easy to apply taxes to because the things that we can easily see are an indicator of wealth or profitability (Keen and Slemrod 2021). The examples are interesting, relevant, and global, and importantly they are the right size to be added to class without taking up excessive preparation or instructional time.

Figure 1.  
*Medieval jettying in Kent, England*



Source: Oast House Archive CC BY-SA 2.0

Figure 2.  
*Amsterdam's tall, narrow buildings*



Source: Pxhere #626195 CC0

Figure 3.  
*Constantly under construction in Cairo*



Source: Kim Eun Yeul, World Bank  
KY-EG006-6802058111

Figure 4.  
*A modern mansard roof*



Source: HABS DC-353-K National Register of  
Historic Places NRIS Number 74002176

Figure 5.  
*Blind windows in Britain*



Source: Kim Traynor, Wikipedia—Windows  
in Brighton Street

Figure 6.  
*Home with brick and flint construction*



Source: Kolfor, Wikimedia Flint House,  
Paston Road, Mundesley, Norfolk, England

Figure 7.  
Elroy-Sparta State Trail in Wisconsin



Source: Ctchrinthry, Wikimedia—  
Djhelroysparta

Figure 8.  
1968 office in Seattle, Washington



Source: Seattle Municipal Archives Item  
175418

*Question: Why would someone design a building with jettying, where the upper floor extends out over the lower floor? (See figure 1.)*

Jettying was a medieval technique for timber-frame building in which the upper floors were cantilevered or projected beyond the building's lower floors. This construction method was advantageous because the larger upper floors increased overall available space, did not obstruct street traffic, provided an overhang that protected the lower floors, and simultaneously minimized the ground-floor footprint. Property taxes were often levied based on the amount of ground-floor space a building occupied, as this was seen as a measure of a property's wealth and importance (Resto and Soderberg 2015). Jettying allowed property owners to use their land more intensively without significantly increasing their property tax liability. By projecting upper floors over the street, property owners could create larger and more valuable living or commercial spaces while still paying taxes based on the smaller ground-floor footprint. This clever manipulation of architectural design was a testament to the resourcefulness of medieval Europeans in navigating the complexities of taxation in their urban environments.

The economics connection: Since people respond to incentives in predictable ways, we can see that when property taxes are applied to the square footage of ground-floor space, there is now an incentive to own smaller first floors. Since choices are influenced by incentives, this tax shifted people away from large first floors and toward smaller ones to save on their taxes. As the rules of the game change, the incentives change, and therefore behavior changes.

*Question: Why would anyone build tall, narrow buildings with stairways that are so skinny that it is almost impossible to put larger pieces of furniture on the upper floors? (See figure 2.)*

Taxes played a significant role in shaping Amsterdam's iconic narrow buildings, often referred to as canal houses. During the Dutch golden age in the seventeenth century, Amsterdam experienced immense prosperity as a major trading and economic hub. Property taxes were primarily based on the width of the building's facade facing the street, a real estate tax assessment referred to as *verponding*. This method of taxation motivated property owners to construct slender buildings with narrow facades to reduce their tax liabilities (Nielsen 2018). As a result, the cityscape of Amsterdam began to be dominated by these tall, narrow houses with their distinctive gables and ornate details.

Narrow canal houses not only served as residences but also as status symbols, reflecting the wealth and prosperity of their owners. Today, these historic buildings continue to stand as tangible reminders of how the rules of the game shaped the distinctive architectural identity of Amsterdam during its golden age. This type of architecture can also be seen in the Caribbean. Curaçao, an island off the coast of Venezuela, was a Dutch colony for almost four hundred years and has similar tall, narrow buildings. In Vietnam, property was also taxed based on street frontage, which not surprisingly led to tube or rocket houses (*nhà ống*) being built, some only 6 1/2 feet wide (Goh 2022; Keen and Slemrod 2021).

The economics connection: When property taxes are based on street frontage, there is an economic disincentive to build wider homes and people will tend to build tall and narrow homes to save on taxes. As rules change, incentives change, and therefore people's choices change.

*Question: Why would a building remain unfinished and be left with incomplete construction showing on upper floors? (See figure 3.)*

Buildings left unfinished can be observed in various countries around the world: Senegal, Nigeria, Peru, and Greece, just to name a few. A building may be incomplete for a variety of reasons—for example, the builder or owner may have a lapse in funding, it may be left this way on purpose to be able to add an additional level later, or climate or tradition may play a role (*Economist* 2021; Keen and Slemrod 2021).

In Cairo, taxes and unfinished buildings have a complex relationship that reflects the challenges and intricacies of Egypt's tax system and urban development. In Cairo, property taxes are often assessed based on the state of completion and occupancy of a building (TADAMUN 2015; Real Estate Taxation Authority 2024). This has led property owners to intentionally leave their buildings unfinished to avoid higher tax rates. Unfinished structures, often referred to as zombie buildings, remain in various stages of construction, sometimes for extended periods, as owners delay completion to mitigate their tax liabilities. Crucially, local custom and lax code enforcement have allowed finished parts of buildings to be occupied and thus to generate revenue.

The economics connection: When the rules of the game that surround the application of taxes on buildings are designed so that taxes are higher for completed buildings, there is an incentive to leave a building unfinished. An incentive can influence people to take or not take action. In this case, there is a motivating factor to leave the building incomplete and accept the lower tax bill.

*Question: Why would rooflines that extend several feet below the actual roof become popular in Paris and in other parts of the world? (See figure 4.)*

Rooflines are another recognizable expression of tax evasion, beginning with the distinctive French mansard roof popular for three hundred years. Named after the architect François Mansard, the mansard roof design features a steep, nearly vertical lower-roof slope that conceals a shallow-sloped upper roof. This design allowed for useful space behind the steep slope, without the taxation of an additional floor. In nineteenth-century Paris, it may have been a height restriction, not a tax, that led builders to embrace the mansard roofs now visible all over the city. Steep slopes and dormered windows allowed them to squeeze in one more floor above the official roofline. The original mansard roof design allowed for an upstairs suite or, at the very least, an attic. Going back to the time of Napoleon, French property taxes were partially based on the stated number of floors a property had below the roofline, hence the name "roof tax."

The economics connection: The creativity of François Mansard was surely a major influence on the roof design, but Mansard was operating under the rules of the game that gave an economic boost to his design. Furthermore, since mansard roofs

were also used on homes of the wealthy, including the Palace of Versailles, the style was later adopted worldwide as a status symbol and became a Hollywood staple (Cupapizarras 2024).

*Question: Why would well-off British homeowners brick up their glass windows? And why would large homes in the United Kingdom have windows that are covered over? (See figure 5.)*

Blind windows as a feature of British houses go back more than three hundred years (Glantz 2008). The British window tax of 1696 was a unique and controversial taxation policy that targeted the number of windows on a property. This tax was levied to generate revenue for the government, particularly to fund the war efforts of the time (Thane 1976). The more windows a property had, the higher the tax it incurred. Reducing the number of windows was a natural reaction to the tax. The window tax remained in place for over a century, and it had a profound impact on British architecture during that period. Many property owners bricked up windows or designed buildings with fewer windows to avoid the tax. This resulted in a shift toward darker and less well-ventilated homes, which had negative implications for public health (Thane 1976; Keen and Slemrod 2021). The tax was eventually repealed in 1851, partly due to public outcry and concerns about its effects on living conditions (Stebbing 2010).

The economics connection: The window tax stands as a historical example of how taxation policies or the rules of the game can distort the economy and affect architectural and social aspects of society (Oates and Schwab 2015).

*Question: Why would someone build a house out of older construction materials (flint, thatching, and clay) or a mixture of materials when there is a brickyard nearby? (See figure 6.)*

An in-depth history of taxes that have been levied on bricks in Britain from 1784 to 1850 indicates that while builders made use of a variety of building materials (flint, clay, and thatching) there was a preference for building with bricks, which was a more modern method. The author states, “It can be argued, [that parsons would] have preferred to have walled their parsonages in brick rather than other materials but as large a proportion of Norfolk parsonages were walled in flint in 1845 as was the case in 1794, despite an active period of parsonage building. The

outcome can, not unreasonably, be seen as a possible effect of the brick-tax.” Using the older building materials tended to date a home, but “builders within the county made use of flint and unfired clay as well as bricks for walling and their use of these materials was itself informative of county and district responses to the tax on bricks” (Lucas 1997).

The economics connection: The increased cost of bricks and tiles due to taxation functioned as a negative incentive and influenced the types of building materials that were used. People made less costly choices and used a mixture of old and new materials. Essentially, there was fiscal discrimination against bricks and tiles, which is supported by tracking of historical data on brick production (Lucas 1997). When the rules of the game changed on brick taxation, people made different choices, which were then reflected in the built environment.

*Question: Why are old railroad lines being converted into walking trails across the United States as part of the Rails-to-Trails Conservancy? (See figure 7.)*

Today, many people enjoy walking or biking along the many trails that have been created by converting old, abandoned railroad lines into a system of trails. On these trails, the first of which is the Elroy-Sparta State Trail in Wisconsin (1967), the bridges and tunnels remain intact, as they are part of the Rails-to-Trails Conservancy.

Railroad lines were increasingly abandoned after deregulation under the 1980 Staggers Rail Act. However, efforts known as railbanking were made to preserve rail corridors in case they were ever needed in the future. The 1983 amendment to Section 8(d) of the National Trails System Act was designed to repurpose railbanked paths into a temporary system of walking and biking trails. The Rails-to-Trails Conservancy was a solution to keep the complicated property rights of the rail corridor intact in case it would need to be reclaimed in the future to maintain shipping lines in times of peace or war (Rails-to-Trails Conservancy 2006).

The economics connection: Property rights are a major component of well-functioning institutions. This example demonstrates how railbanking keeps the property rights of the railway intact while allowing for the railbanked paths to be used as greenspaces in the built environment.

*Question: Why would office partitions or cubicles suddenly become popular in office buildings in the United States in the 1960s to 1970s when the design was originally a flop? (See figure 8.)*

The US Investment Tax Credit contained in the Revenue Act of 1962 allowed for a business to “subtract 8% from its overall tax liability for new investment in tangible business assets other than buildings.” The tax was an “outright subtraction,” and it also let business owners take the fully allowable depreciation of the cost of the acquired business asset. “The credit is available for investments in tangible personal property and certain real property used in business, so long as it is not a building or a structural component of a building” (Committee on Finance, US Senate 1962).

This was a very generous tax break for business, especially since movable office partitions or cubicles had recently been created and designed by Robert Probst of the Herman Miller furniture company. Since businesses could not renovate the actual building or structural components, they focused on overhauling the interior (Keen and Slemrod 2021). A cubicle or office partition is a freestanding design that allows for more office space without having to build interior structures in a building. The combination of the new furniture design and the generous tax credit transformed office spaces into what we are familiar with today (Shanahan 2015; Saval 2014).

The economics connection: The tax laws for business tax liability changed with the passage of the Revenue Act of 1962. A business could suddenly write off 8 percent of its spending on new investments in business assets. The ability to get an 8 percent discount on its investment in furniture changed the incentives for business owners and therefore changed their choices and the work environment.

## **V. Conclusion**

Our exploration of examples from the built environment illustrates the impact of economic principles on our surroundings in the built environment. From medieval construction methods to modern office designs, these examples demonstrate how economic institutions, tightening or loosening constraints, or general changes in the rules of the game fundamentally change the incentives that people face, leading to different choices that leave a lasting imprint on our world.

This collection of questions, images, and historical context showcases how minor alterations in economic institutions can lead to significant shifts in behavior and outcomes. By using question-driven instruction and presenting students with these eight economic mysteries, they will discover how very small, intangible changes in a country's tax code or a city's zoning laws (Tabarrok 2023) result in very tangible changes to the buildings they live in, the paths they walk on, and the offices they will someday work in.

Figure 9 presents a QR code connecting the reader to a full set of instructional resources, which includes full color slides, a student worksheet, and the full color images from figures 1–8. These materials will be of immediate benefit to instructors and allow them to implement the lessons outlined in this paper without the burden of recreating the examples on their own.

*Figure 9. Instructional-resources QR code*



*Source:* <http://tiny.cc/RulesOfTheGame>

Our goal is to help students develop an appreciation of the economic way of thinking and key economic principles. This educational note was designed to offer students valuable insight into the broader influence of economics and see it at work in their everyday lives. Along the way, we hope, students will gain a deeper appreciation for the importance of economic reasoning in tax policy design and recognize the pervasive influence that economics has in shaping the real world that surrounds them.

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