



Vouchers as innovation contracts

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Abstract

This paper models voucher systems for welfare services as contracts through which the public sector pays firms to discover cost-reducing innovations. By allowing providers to retain the difference between the voucher payment and their realized costs, the system creates residual claimancy and incentives for experimentation when innovative effort cannot be directly contracted upon. Fiscal savings for taxpayers require that the voucher be set below the cost of public production. Using a two-period model, it is shown that if the government lowers vouchers in response to observed cost reductions, a ratchet effect arises, weakening innovation incentives. The ratchet result remains when the model is extended to include quality shading and costly monitoring. The theoretical results are applied to the debate on profits and school vouchers in Sweden.

Keywords School vouchers · Quasi-markets · Innovation · Welfare state

1 Introduction

Voucher systems in the provision of welfare services are controversial. Advocates argue that choice and competition can improve user satisfaction and quality, while critics warn of cream skimming and a decline in quality. This paper contributes to our understanding of quasi-markets by examining a different dimension of vouchers that has received limited formal attention. The central claim is that a voucher system allows private providers to retain the difference between the voucher payment and their own production cost, creating a simple and powerful reward for discovering more cost efficient techniques. The firm becomes the residual claimant on the surplus generated by its own innovation. In this interpretation, the profit margin is not a leakage of public funds but the price the government pays to induce discovery in a domain where innovative effort cannot easily be observed or contracted for. This

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interpretation aligns with a long tradition in economics that emphasizes the discovery role of decentralized decision-making.

However, these profits are often a subject of controversy in public debates about voucher systems. A central result of this paper is that while the gains from innovation can be transferred to taxpayers through lower voucher payments, doing so also reduces firms' incentives to innovate. The government, therefore, faces a fundamental trade-off between capturing cost savings and sustaining the innovation that produces those savings.

This paper contributes by combining insights from the principal–agent literature with the two-period logic from Laffont and Tirole (1986) to create a formal model of vouchers as innovation contracts. The government can either produce a public service itself or fund private provision through vouchers. Private firms invest in innovation when the voucher structure gives them a claim on the resulting cost savings. The public sector potentially benefits because it can set the voucher at the participation constraint and ultimately purchase a lower cost technology. A two-period extension shows that if the government lowers the voucher in response to observed cost reductions, a ratchet effect arises that weakens innovation incentives. When commitment is possible, the voucher system functions like an option contract that purchases the discovery of efficient production methods on behalf of the state. A further extension introduces quality shading and costly monitoring, and shows that the ratchet result on desirable cost-reducing innovation holds also in this richer environment.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 presents the baseline static model. Section 4 extends the analysis to a two-period game and derives the ratchet effect and the partial clawback result. Section 5 examines robustness when quality shading and costly monitoring are added to the model. Section 6 discusses the results in the context of the Swedish school voucher debate. Section 7 summarizes and concludes.

2 Related literature

This paper is related to several strands of economic research. First, it concerns the role of decentralized knowledge in entrepreneurial discovery and production. Hayek (1945) emphasized that economic systems function well when they enable local experimentation, since producers possess knowledge that central planners cannot easily access. Kirzner (1973) described profit as a reward for discovering opportunities that others have overlooked, and Nelson and Winter (1982) formalized innovation as an evolutionary process driven by routines and search. These ideas form the conceptual foundation for interpreting vouchers as a mechanism for encouraging discovery within publicly financed services.

It should be noted, however, that the claim that public providers systematically lack innovation incentives is a simplifying assumption of the baseline model rather than a universal empirical regularity. Innovations occur also without residual

claimancy and also in the public sector. In fact, as De Fraja (1993) and Willner and Parker (2007) discuss, non-profit and welfare-maximizing organizations may under some conditions have stronger incentives to pursue efficiency than their profit-maximizing counterparts. Similarly, large private firms typically delegate operational decisions to salaried managers, creating principal–agent problems analogous to those in the public sector. The model therefore should be interpreted as characterizing one important institutional margin rather than as a general claim about public sector inefficiency.

A second strand examines vouchers and quasi-markets. Le Grand (1991) introduced the idea of quasi-markets as a way to combine public financing with market allocation. Much of the literature has focused on consumer choice and competition effects, such as productivity in schooling (Böhlmark and Lindahl 2015; Sandstrom and Bergstrom 2005) and innovation pressures (Lubienski 2009). Similar themes appear in studies of competition in health care (Gaynor et al. 2013). This work considers quasi-markets as tools for improving efficiency.

A third related literature concerns the design of incentives for cost-reducing effort in regulated or publicly financed industries. The classical principal–agent framework in procurement and regulation shows how a buyer can motivate firms to invest in cost reduction (Laffont and Tirole 1993; Lewis and Sappington 1991). This literature normally requires contracts that make payments contingent on observed costs or performance. Aghion et al. (1990) analyze situations in which some actions are non-verifiable, which strengthens the case for simple arrangements that reward successful experimentation without relying on detailed contract terms.

Public–private provision has also been studied in a framework where private actors may have stronger incentives for cost-cutting. Hart et al. (1997) examine this idea in the context of incomplete contracts and quality shading. Their analysis highlights potential trade-offs between cost reduction and quality when quality is difficult to monitor. The present paper takes this concern seriously. The baseline model abstracts from quality trade-offs by assuming that quality is perfectly enforced, treating this as a clean benchmark that isolates the cost-innovation mechanism. A subsequent extension relaxes this assumption by introducing quality shading and endogenous monitoring costs, allowing for the possibility that quality deterioration is unavoidable in equilibrium.

Closest in spirit to the argument developed here are discussions of how public institutions can benefit from privately generated innovations without specifying them *ex ante*. Kremer (1998) shows how governments can purchase innovation through patent buyouts. The mechanism in that paper is different, but the logic is similar. Society benefits when the state finds a way to reward firms that reveal cost-reducing ideas. The voucher mechanism in this paper can be interpreted as a simple and workable contract that achieves this objective in settings where quality is standardized and demand is fixed (but see Sect. 5 on quality shading and monitoring).

3 The model

Consider a fixed quality public service q consumed by a unit mass of citizens. Demand is assumed to be inelastic throughout the paper.¹ The government can either produce the service itself at a cost of c_G per unit or fund private provision through a voucher of value v paid to any licensed provider. Quality standards are assumed to be enforced in the baseline model, so providers differ only in cost discovery and routine operations (this assumption is relaxed in Sect. 5). Table 1 summarizes all notation used in the model.

A private firm has baseline production cost c_0 and can invest in innovation effort $k \geq 0$. Following e.g., Laffont and Tirole (1993), cost-reducing effort has a convex cost

$$\phi(k) = \frac{1}{2}\gamma k^2, \quad (1)$$

with $\gamma > 0$. Innovation reduces the production cost to

$$c(k) = c_0 - \theta k, \quad (2)$$

where $\theta > 0$ measures the productivity of innovative effort.

3.1 Private production and innovation

A firm that accepts the voucher receives v and produces at cost $c(k)$, earning profit

$$\pi(k) = v - c(k) - \phi(k) = v - c_0 + \theta k - \frac{1}{2}\gamma k^2.$$

The firm chooses k to maximize profit. The first-order condition yields the optimal innovation effort

$$k^* = \frac{\theta}{\gamma},$$

and the resulting cost is

$$c^* = c_0 - \frac{\theta^2}{\gamma}.$$

The firm will not participate unless profits are weakly positive: $\pi(k^*) \geq 0$, which implies that the voucher must satisfy the participation constraint

¹ Relaxing the inelastic demand assumption would introduce an additional channel through which voucher policy affects welfare: if demand responds to price or quality, changes in the voucher could affect both the number of users served and the composition of demand. The qualitative insight that residual claimancy drives innovation incentives would remain, but the government's optimization problem would become more complex, potentially creating additional trade-offs between access and efficiency. We leave a full treatment of elastic demand for future work. When applied to schooling, the assumption is unproblematic because attending school is typically mandatory.

Table 1 Model variables and parameters

Symbol	Explanation
<i>Baseline model</i>	
v	Voucher size, a per-unit payment from the public sector
c_G	Public production cost
c_0	Baseline cost for private providers
k	Level of investment in cost-reducing discovery
θ	Productivity of innovation in reducing costs
γ	Cost parameter for innovation effort
$\phi(k)$	Convex cost of innovating, defined as $\frac{1}{2}\gamma k^2$
$c(k)$	Realized production cost, defined as $c_0 - \theta k$
β	Discount factor for future profits
α	Clawback: share of cost savings captured via voucher adjustment
<i>Quality shading and monitoring extension</i>	
k_S	Safe innovation effort (cost reduction without quality loss)
k_Q	Quality shading effort (cost reduction that lowers quality)
θ_S	Productivity of safe innovation in reducing costs
θ_Q	Productivity of quality shading in reducing costs
γ_S	Cost parameter for safe innovation effort
γ_Q	Cost parameter for quality shading effort
$\bar{q}$	Baseline quality level
p	Detection probability for quality shading
$\bar{p}$	Minimum detection probability needed to deter quality shading
λ	Cost parameter for monitoring intensity
ω	Social cost per unit of quality reduction
F	Penalty per unit of quality shortfall
δ	Rate at which quality shading effort reduces quality

$$v \geq c_0 - \frac{\theta^2}{2\gamma}.$$

Vouchers lower total costs, including the cost of innovation effort, if

$$c_0 - \frac{\theta^2}{2\gamma} < c_G.$$

Even if the baseline private cost c_0 exceeds the public cost, innovation may reduce the achievable cost below c_G . Vouchers, however, will lead to lower public spending (and potentially lower taxes) only if

$$v < c_G.$$

The model has a number of intuitive implications. Innovation is more attractive when effort is more productive. A higher value of θ raises the marginal return to experimentation and increases the cost reduction that a firm can capture. A lower

value of γ makes experimentation cheaper and strengthens the incentive to invest in discovery. The public sector cost level c_G matters because high public costs amplify the fiscal gains from private discovery. The baseline private cost c_0 is less important than the achievable cost c^* .

3.2 Welfare effects

With quality fixed, total welfare improves whenever vouchers reduce total costs relative to public production:

$$\Delta W = c_G - \left(c_0 - \frac{\theta^2}{2\gamma} \right).$$

This expression is positive whenever innovation can lower cost sufficiently. If the government sets the voucher at the participation constraint, the fiscal gain is maximal. If the voucher is set higher but lower than c_G , the cost reduction is partly captured by the firm as profit and partly by the government as a lower expenditure level. Innovation therefore generates a social surplus that is shared between the public and private sectors.

4 A two-period game and the ratchet effect

The previous analysis treated the voucher as a static arrangement. In practice, governments may adjust voucher levels over time when they observe successful cost reductions by private providers. This section introduces a simple two-period game in order to study how such adjustments affect innovation incentives. The key result is a dynamic inconsistency problem that resembles the ratchet effect in regulation (Laffont and Tirole 1986, 1993).

4.1 Timing and assumptions

Time is discrete, $t = 1, 2$. As before, the service has fixed quality and inelastic demand, and the government can either produce the service at cost c_G per period or use a voucher system with a per-unit payment v_t in period t .

A single private firm can invest in a cost-reducing innovation in period-1. The firm's baseline cost is c_0 . Innovation effort $k \geq 0$ is chosen in period-1 and paid once. The cost reduction is permanent and applies in both periods. As before,

$$c(k) = c_0 - \theta k, \quad \theta > 0,$$

and the cost of effort is

$$\phi(k) = \frac{1}{2}\gamma k^2, \quad \gamma > 0.$$

The firm discounts future profits with factor $\beta \in (0, 1)$. The timing of the game is as follows.

1. At the beginning of period-1, the government chooses a voucher v_1 . In the commitment case considered below, it also commits to a rule for v_2 . In the no-commitment case, it does not.
2. Observing v_1 , the firm chooses innovation effort k in period-1. Cost in both periods becomes $c(k)$.
3. The firm produces the service in period-1 and receives v_1 . Period-1 profit is $v_1 - c(k) - \phi(k)$.
4. At the beginning of period-2, the government observes the realized cost $c(k)$.
5. The government then chooses v_2 subject to firm participation.
6. The firm decides whether to produce in period-2. If it does, it receives v_2 and incurs cost $c(k)$.

The government's objective is to minimize total expenditure on the public service across both periods, subject to maintaining private provision. This formulation captures the fiscal motive that drives voucher adjustment in practice: when observed costs fall, a government focused on expenditure minimization has an immediate incentive to reduce the voucher accordingly.² To focus on the dynamic incentive problem, we assume that c_G is high enough that the government prefers vouchers to public production in both periods whenever private participation is possible.

4.2 Commitment benchmark

First, consider a benchmark in which the government can commit in period-1 to a constant voucher $v_2 = v_1 = v$ for both periods. The firm anticipates that any cost reduction will generate profit in period-1 and in period-2.

Total discounted profit for a given k is

$$\begin{aligned}\Pi^C(k) &= [v - c(k) - \phi(k)] + \beta[v - c(k)] \\ &= [v - c_0](1 + \beta) + (1 + \beta)\theta k - \frac{1}{2}\gamma k^2.\end{aligned}\quad (3)$$

The term $[v - c_0](1 + \beta)$ does not depend on k and can be ignored for the choice of effort. The firm chooses k to maximize

$$(1 + \beta)\theta k - \frac{1}{2}\gamma k^2.$$

² Alternative government objectives, such as maximizing a weighted sum of consumer welfare and fiscal savings, or incorporating electoral considerations, would modify the precise level of voucher adjustment but not the qualitative direction of the ratchet effect. As long as the government places some positive weight on fiscal savings and can observe realized costs, the incentive to adjust the voucher downward after a cost reduction is present.

The first-order condition is

$$(1 + \beta)\theta - \gamma k = 0,$$

which gives the optimal innovation level under commitment:

$$k^C = \frac{(1 + \beta)\theta}{\gamma}. \quad (4)$$

Because the cost reduction is permanent, each unit of effort yields benefits in both periods. Under commitment, the firm expects to keep the resulting cost savings in both periods through a constant voucher. The incentive to invest in innovation scales with the factor $(1 + \beta)$. In the two-period model, fiscal savings require discounted voucher expenditure to be below the discounted cost of public production:

$$v_1 + \beta v_2 < (1 + \beta)c_G.$$

The static condition $v < c_G$ is the one-period counterpart of this requirement.

4.3 No commitment and voucher adjustment

Now suppose the government cannot commit to future vouchers. One motivation might be that voters find private provider profits controversial and demand that the voucher is lowered. In period-2, the government chooses v_2 after observing $c(k)$. The government wants to minimize expenditure subject to firm participation. Since the firm can always earn zero by not producing, the period-2 participation constraint is

$$v_2 - c(k) \geq 0.$$

The government therefore chooses

$$v_2 = c(k).$$

As a result, period-2 profit is zero, regardless of the level of k . The firm anticipates this when choosing innovation effort in period-1. Its total discounted profit becomes

$$\begin{aligned} \Pi^{NC}(k) &= [v_1 - c(k) - \phi(k)] + \beta \cdot 0 \\ &= v_1 - c_0 + \theta k - \frac{1}{2}\gamma k^2. \end{aligned} \quad (5)$$

The term $v_1 - c_0$ does not depend on k . The firm chooses k to maximize

$$\theta k - \frac{1}{2}\gamma k^2.$$

The first-order condition is

$$\theta - \gamma k = 0,$$

which yields

$$k^{NC} = \frac{\theta}{\gamma}. \quad (6)$$

4.4 Comparison and interpretation

Comparing the two cases gives

$$k^C = (1 + \beta) \frac{\theta}{\gamma} > \frac{\theta}{\gamma} = k^{NC}$$

for any $\beta > 0$. The inability to commit to a stable voucher path leads the government to adjust the voucher downward once it observes a lower cost. Anticipating this, the firm invests less in innovation in period-1. The government lowers the voucher in period-2 and captures the entire cost reduction, but this expropriation of rents reduces the initial incentive to innovate.

From a social perspective, the cost reduction benefits the government in both periods. If the government internalizes fiscal savings over two periods with discount factor β , the efficient innovation level coincides with the commitment solution k^C . When the government cannot commit, equilibrium innovation is below this level. The dynamic structure of the voucher game therefore generates underinvestment in discovery relative to the social optimum.

This simple two-period extension shows that vouchers can suffer from a ratchet effect. When the government uses observed cost reductions to justify lower voucher payments in the future, it weakens the very profit opportunities that drive innovation. In contrast, a credible commitment to a stable voucher path strengthens the discovery role of vouchers and aligns private incentives with public expenditure savings.

4.5 Partial clawback and innovation incentives

The commitment and no-commitment cases can be unified by introducing a simple clawback parameter. Let $\alpha \in [0, 1]$ denote the share of period-2 cost savings that the government captures by lowering the voucher. When $\alpha = 0$, the government fully commits to a stable voucher and allows the firm to retain all period-2 savings. When $\alpha = 1$, the government fully claws back the savings by setting the voucher equal to realized cost, as in the no-commitment case.

Formally, suppose the period-2 voucher is set according to

$$v_2 = c(k) + (1 - \alpha)[v_1 - c(k)].$$

When $\alpha = 0$, this implies $v_2 = v_1$, while when $\alpha = 1$, it implies $v_2 = c(k)$.

The firm's total discounted profit is

$$\begin{aligned} \Pi(k; \alpha) &= [v_1 - c(k) - \phi(k)] + \beta[v_2 - c(k)] \\ &= [1 + \beta(1 - \alpha)](v_1 - c_0) + [1 + \beta(1 - \alpha)]\theta k - \frac{1}{2}\gamma k^2. \end{aligned} \quad (7)$$

Maximizing with respect to k yields the first-order condition

$$[1 + \beta(1 - \alpha)]\theta - \gamma k = 0,$$

which gives optimal innovation effort

$$k(\alpha) = \frac{[1 + \beta(1 - \alpha)]\theta}{\gamma}.$$

Innovation effort is decreasing in α . A higher clawback rate reduces the expected return to innovation by shrinking the share of future cost savings that the firm can retain. In the extreme cases, $k(0) = k^C$ and $k(1) = k^{NC}$, reproducing the commitment and no-commitment benchmarks. This formulation makes explicit how intermediate voucher adjustment rules generate a continuous trade-off between fiscal capture and innovation incentives.

5 Robustness: quality shading and costly monitoring

The baseline model assumes that quality is perfectly enforced at no cost to the public sector, which is an idealization. This section relaxes that assumption in a tractable way. The main purpose is to verify that the ratchet result on desirable cost-reducing innovation is robust when firms can engage in quality shading and when monitoring is costly.

Suppose the firm can allocate effort between two channels:

- $k_S \geq 0$: safe innovation, i.e., efficiency improvements that reduce cost without affecting quality,
- $k_Q \geq 0$: quality shading, i.e., cost reductions that also lower the quality of the service.

Unit production cost is

$$c(k_S, k_Q) = c_0 - \theta_S k_S - \theta_Q k_Q,$$

with $\theta_S, \theta_Q > 0$, and effort costs are convex and separable:

$$\phi(k_S, k_Q) = \frac{1}{2}\gamma_S k_S^2 + \frac{1}{2}\gamma_Q k_Q^2.$$

Let $\bar{q}$ be the (exogenous) baseline Quality falls with k_Q :

$$q(k_Q) = \bar{q} - \delta k_Q, \quad \delta > 0.$$

Government's monitoring problem.

Unlike the baseline model, the government cannot freely enforce quality. It chooses a detection probability $p \in [0, 1]$ at a convex cost

$$\mu(p) = \frac{1}{2}\lambda p^2, \quad \lambda > 0,$$

where λ parameterizes the cost of monitoring intensity.

If quality shading is detected, the firm pays a penalty equal to $F(\bar{q} - q) = F\delta k_Q$, where $F > 0$ is the penalty per unit of quality shortfall. The expected penalty is therefore $pF\delta k_Q$.

The government chooses p before the firm chooses (k_S, k_Q) . Taking p as given, the firm faces an expected per-period penalty of $pF\delta k_Q$, so its per-period payoff is

$$\pi(k_S, k_Q) = v - c(k_S, k_Q) - \phi(k_S, k_Q) - pF\delta k_Q.$$

The firm's optimal quality shading effort, given p , is

$$k_Q(p) = \max \left\{ \frac{\theta_Q - pF\delta}{\gamma_Q}, 0 \right\}.$$

Quality shading is fully deterred when $p \geq \bar{p} \equiv \theta_Q/(F\delta)$.

Government's optimal monitoring.

The government values quality and incurs monitoring costs. Assume that it chooses p to minimize monitoring expenditure and the welfare loss from quality shading:

$$\min_{p \geq 0} \quad \frac{1}{2}\lambda p^2 + \omega\delta k_Q(p),$$

where $\omega > 0$ captures the social cost of quality reduction. Substituting $k_Q(p)$ for $p < \bar{p}$:

$$\min_p \quad \frac{1}{2}\lambda p^2 + \omega\delta \cdot \frac{\theta_Q - pF\delta}{\gamma_Q}.$$

The first-order condition is

$$\lambda p - \frac{\omega F \delta^2}{\gamma_Q} = 0,$$

and the unconstrained interior solution is

$$\tilde{p} = \frac{\omega F \delta^2}{\lambda \gamma_Q}. \quad (8)$$

Because $p \in [0, 1]$ and monitoring beyond the level required for full deterrence (if possible) has no additional benefit, the optimal detection probability is

$$p^* = \min \left\{ \frac{\omega F \delta^2}{\lambda \gamma_Q}, \frac{\theta_Q}{F\delta}, 1 \right\}. \quad (9)$$

When monitoring is sufficiently costly (large λ) or when quality shading is sufficiently productive (large θ_Q), some quality shading occurs in equilibrium, with

$$k_Q^* = \frac{\theta_Q}{\gamma_Q} - \frac{\omega F^2 \delta^3}{\lambda \gamma_Q^2} > 0. \quad (10)$$

In other words, effective quality enforcement requires either low monitoring costs or strong penalties, and when these conditions are not met, some quality reduction is unavoidable. Whether vouchers remain socially desirable in this case depends on comparing the cost savings from safe innovation with the welfare loss from residual quality shading.

Ratchet result under costly monitoring. The key question for robustness is whether the ratchet effect on safe innovation k_S survives the introduction of quality shading and costly monitoring. The answer is yes, and the argument is straightforward.

Safe innovation effort k_S enters the firm's profit only through its effect on production costs. It does not affect quality, the penalty, or the monitoring problem. The government's monitoring choice p^* is independent of k_S . Therefore, the firm's optimization over k_S is separable from the quality shading problem.

Under commitment to a constant voucher, the firm maximizes total discounted profit with respect to k_S :

$$\max_{k_S} (1 + \beta)\theta_S k_S - \frac{1}{2}\gamma_S k_S^2,$$

giving

$$k_S^C = \frac{(1 + \beta)\theta_S}{\gamma_S}. \quad (11)$$

Without commitment, period-2 profit on the safe innovation margin is fully clawed back, so the firm maximizes only period-1 returns:

$$\max_{k_S} \theta_S k_S - \frac{1}{2}\gamma_S k_S^2,$$

giving

$$k_S^{NC} = \frac{\theta_S}{\gamma_S}. \quad (12)$$

Therefore, $k_S^C = (1 + \beta)k_S^{NC} > k_S^{NC}$ for any $\beta > 0$, regardless of p^* and regardless of whether quality shading occurs in equilibrium.

Interpretation. This extension separates two distinct institutional margins. Monitoring intensity p^* , determined by Eq. (9), governs the *composition* of innovation: stronger monitoring steers firms away from quality shading and toward safe efficiency improvements, but at a fiscal cost. Commitment to a stable voucher path governs the *level* of safe innovation: anticipated clawback of future rents depresses k_S regardless of monitoring. These two margins are independent, which means that

tightening quality enforcement and stabilizing voucher payments are complementary policies rather than substitutes. A government that tightens monitoring without committing to stable vouchers will improve the composition of cost reductions but still generate underinvestment in safe innovation.

6 The model and the Swedish experience

The Swedish school voucher reform, introduced in 1992, created a system of publicly financed but privately provided schooling in which municipalities reimburse independent schools on a per-student basis. Unlike many other countries, Sweden permits for-profit providers to distribute profits. Since the early 2000s, these profits have been at the center of political controversy, with recurring proposals to cap or prohibit them.

Most empirical studies of the reform focus on competition and student outcomes (see Blix and Jordahl (2021) for a survey). Evidence suggests modest positive effects of school choice and competition on achievement and productivity, particularly in the early years of the reform (Böhlmark and Lindahl 2015; Sandstrom and Bergstrom 2005). At the same time, concerns have been raised about grade inflation, segregation, and strategic responses by providers (Berg 2026; Bergh and Wernberg 2025; Brandén and Bygren 2022; Wiborg 2015). In public debate, profits are often interpreted as evidence that voucher payments exceed necessary costs and represent a transfer from taxpayers to owners (Wiborg 2015; Dahlstedt and Fejes 2019).

The framework developed in this paper offers a complementary perspective. In the model, profits are the return to cost-reducing experimentation when innovative effort cannot be directly contracted upon. The voucher creates residual claimancy: providers retain the difference between reimbursement and realized cost, which induces search for more efficient organizational and pedagogical practices. Profits are therefore not merely a distributive outcome but part of the incentive mechanism that transforms decentralized experimentation into fiscal savings.

The two-period extension highlights a central tension. If the government adjusts voucher payments downward in response to observed cost reductions, it captures fiscal savings but weakens future incentives to innovate. Anticipating such adjustments, firms invest less in cost-reducing effort. Thus, if it is important that taxpayers benefit from cost innovation, discounted voucher expenditure must eventually fall below the corresponding discounted cost of public production. A voucher that remains equal to c_G in every period transfers no fiscal savings to taxpayers, regardless of how much cost-reducing innovation occurs.

The robustness extension further shows that monitoring and commitment are two independent institutional margins: the composition of innovation depends on monitoring intensity, while the level of safe innovation depends on the credibility of the voucher path. Applying the framework to Swedish schooling reveals a specific risk that the model helps to articulate. Consider first the monitoring margin. Educational quality is multidimensional and difficult to observe. Outcomes such as long-run skill development, critical thinking, and student wellbeing are particularly hard to contract upon. Grade inflation, reduced teaching hours, and lower staff-to-pupil ratios

can reduce costs while appearing compliant with formal quality standards. This suggests that in education, the parameter λ (the cost of monitoring intensity) is high, implying a low optimal p^* and substantial residual quality shading in equilibrium, as shown in Sect. 5. The institutional conditions for keeping k_Q low are therefore less favorable in education than in sectors where quality is more easily measured and contracted.

Consider next the commitment margin. The model shows that safe innovation k_S increases with the credibility of the voucher path. In education, such safe innovation may be improvements in pedagogy, curriculum design, organizational practice, and teaching methods. If safe innovation is available under public provision through intrinsic motivation of teachers and school leaders, the marginal contribution of residual claimancy to k_S may be smaller than the model's baseline suggests (see Ryan and Deci (2000); Bénabou and Tirole (2003); Besley and Ghatak (2018)). A rich literature documents that professional motivation in education is strongly non-pecuniary, and that extrinsic incentives can in some circumstances crowd out intrinsic motivation, particularly in multitask settings where some dimensions of effort are difficult to observe (Holmström and Milgrom 1991; Grönblom and Willner 2014).³ Taken together, these considerations suggest that the Swedish voucher system, as currently designed, faces challenges on both margins: monitoring costs are high relative to the complexity of educational quality, and the voucher is set at rather than below public production cost, eliminating fiscal savings for taxpayers and increasing quality shading risks. Whether these design features can be improved upon—through stronger quality enforcement, more credible reimbursement commitments, and a voucher level that actually transfers fiscal gains to taxpayers—is ultimately an empirical and political question that the model helps to frame but cannot resolve.

7 Conclusion

Traditional debates surrounding voucher systems often focus on the immediate effects of consumer choice and competition. This paper has demonstrated that vouchers also act as a contractual mechanism that incentivizes the discovery of more efficient production methods. By allowing private providers to retain the surplus between the voucher payment and their actual costs, the state effectively purchases entrepreneurial innovation that it could not easily produce internally.

The model reveals that the long-term success of such systems depends on how the government manages the resulting fiscal gains. A central finding is a trade-off: if the state lowers voucher payments upon observing cost reductions, it destroys the profit motive that drives firms to experiment.

³ A similar conclusion is recently reached by Willner and Grönblom (2025) which shows that whether innovation is higher under public or private ownership depends on governance quality and institutional conditions more broadly.

Based on the analysis in this paper and previous research, the conditions under which vouchers are likely to improve efficiency can now be stated: Safe innovation is favored when monitoring is cheap and effective, when private providers can achieve costs substantially below public production, when providers do not have a strong intrinsic motivation, and when the government can credibly commit to a stable voucher path. In education, some will no doubt conclude that the case for vouchers as innovation contracts is weak, and that public provision supported by strong professional norms and adequate resources is preferable. For others, it will suggest that the solution lies not in abandoning vouchers but in strengthening the institutional conditions that shift the balance toward improving monitoring capacity, enforcing quality standards more rigorously, and committing credibly to stable reimbursement levels.

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