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Abstract
I apply an incomplete contracts approach to analyze the lottery industry and argue that even if the addictive potential of lotteries is taken into account and government is charitably assumed to be benevolent, lottery services are more efficiently provided by private enterprises than by public enterprises. However, in most countries state-owned enterprises, in fact, provide lottery services. In Germany, the 16 states each own a monopoly lottery-providing enterprise. I resolve this apparent puzzle by dropping the assumption that members of government are perfectly benevolent and maintain that the narrow self-interests of members of the state governments and other influential stakeholders in Germany help to explain the persistence of the current structure of the lottery industry.

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1. Introduction

Government enterprises as monopoly providers of lotteries can be observed in many countries. By owning lottery enterprises governments determine what characteristics lottery services have and raise revenue for their budgets. Alternatively, governments could leave the provision of lottery services to private actors and tax and regulate their activities as deemed necessary. I argue that even if the addictive potential of lotteries is taken into account and government is assumed to be perfectly benevolent, lotteries are more efficiently provided by private enterprises than by state-owned enterprises. Further, to explain why government-owned lottery monopolies nonetheless persist in Germany I drop the assumption of perfect benevolence on the part of government and provide an analysis of the not-so-noble incentives of the members of state governments and other influential stakeholders of the lottery industry.

If a benevolent government wishes a certain service to be provided or a provided service to have certain characteristics, it faces a "make or buy" decision similar to that of firms that have to decide whether or not to vertically integrate. The government has to decide to rely on public agents and "make" the service or to rely on private agents and "buy" the service. Thereby the government has to consider that managers of state-owned enterprises face different incentives than owners of private enterprises.

If it was possible for governments to write complete contracts, it would not matter if governments made or bought services. All contingencies could be anticipated and contracts between a government and the manager of a state-owned enterprise or between a government and the owner of a private provider could *ex ante* stipulate how to deal with any contingency. However, as the future is inherently uncertain and not all potential future states of the world are known, all contracts are necessarily incomplete. Therefore, it matters if private actors or a state-owned enterprise managed by a government employee serve as providers and thus hold the residual rights of control (Schmidt 1996, 3; Hart et al. 1997, 1128), because the holder of

the residual control rights decides how to use an asset, for instance a lottery company, in cases of uncontracted-for contingencies.

Hart et al. (1997) and Shleifer (1998) focus on a provider's incentive to bring about two types of contractually unaccounted-for innovation.[2] First, a provider can exert effort to invest in the quality of a service. Second, investments can be made in the reduction of the cost of providing a service, which is assumed to negatively affect the service's quality. Hart et al. (1997) argue that private providers have relatively strong incentives both to invest in quality improvements and to invest in cost reductions, because they are residual claimants. In contrast, managers of state-owned providers have relatively weak incentives to engage in quality-improving investments or to make investments that reduce costs, because they have no claim to the extra profits realized by their innovation efforts.

As cost-reducing investments may have negative effects on quality, the model proposed by Hart et al. (1997) suggests that private provision is more efficient if the potential for uncontracted-for quality improvements and cost reduction through innovation is large and the potential for uncontracted-for cost reductions that have negative effects on the quality of the service is small. If cost-reducing investments have no negative effect on the quality of a service, private provision is always more efficient, because the private owner has a stronger incentive to engage in investments that increase quality and reduce cost. Further, as Hart et al. (1997, 1144) point out, the more intense the competition between private suppliers is, the more they have an incentive to take the net effects of innovations on their customers into account and, therefore, the more likely it is that private provision is preferred over public provision.

Government provision is only efficient if the potential for uncontracted-for quality improvements and cost reduction is small and the potential for quality-harming uncontracted-

[2] Since contracting is a way for the government to regulate a contractor's behavior, I will in the following use the terms *regulation* and *contract* interchangeably in a broad sense, including both regulations issued by the government that potentially apply to more than one private actor and contracts between individual private actors and the government or individual government employees and the government.

for cost reduction is large. Such cases are rare. Shleifer (1998, 148) accordingly remarks: "A good government that wants to further 'social goals' would rarely own producers to meet its objective."

In this paper I make two main contributions. First, I apply the model by Hart et al. (1997) and Shleifer (1998) to provide an analysis of the lottery industry. I argue that even if the charitable assumption of perfect government benevolence is made and the addiction potential of lotteries is acknowledged, the provision of lotteries by private enterprises is to be preferred over the provision by state-owned enterprises. Non-addicted players unequivocally benefit from the stronger incentives of private providers to improve the quality of lotteries and reduce their costs. The net welfare effect from private provision compared to the provision by state-owned enterprises through the consumption of addicted lottery players is theoretically undetermined, because most aspects of lotteries that affect their addictiveness can easily be accounted for by regulation. As the group of non-addicted players is large and the effects on the small group of addicted players is ambiguous, the private provision of lottery services in all likelihood is the more efficient mode of production.

Second, to explain the continued existence of state-owned lotteries in Germany despite the desirability of private lottery providers, which a benevolent government could tax and regulate to attain its goals, I drop the assumption that members of the state governments are perfectly benevolent. I argue that they, in part, pursue their narrow self-interest by hiring individuals for management positions in state-owned lottery enterprises to whom they have political ties and by using the state-owned lottery enterprises as sponsors for activities, which could also be financed via the state's budgets directly. Also, I argue that managers and other employees of the state-owned lottery firms have an interest in conserving the current structure of the lottery industry, as they benefit from the weak incentives of the state governments to run the state-owned lottery enterprises efficiently. Finally, I maintain that private lottery vendors who provide sales services to the state-owned lottery enterprises also do not have an

incentive to lobby for a change in the industry's structure. I present quantitative data and anecdotal evidence from the German lottery industry and point to existing evidence from other industries to support my arguments.

The extant economics literature on lotteries run by governments is large and growing.[3] But contributions to it do not provide an analysis of the relative attractiveness of lottery provision through private or state-owned enterprises rooted in the incomplete contracts literature and also rarely ask the question: why do governments usually "make" lotteries instead of "buying" them?

Paldam (2008, 191) takes the potential addictiveness of lotteries into account and maintains that "the argument for a GSOE [Gambling State Owned Enterprise] is that it may provide fewer triggers by behaving more responsibly and less efficiently. Also, it is closer to the politicians, who have people's welfare in mind. But then, politicians are also susceptible to stakeholders, and they want tax revenues." Later, Paldam (2008, 203) argues that the small group of potential gambling addicts is not well organized and therefore politically not particularly influential. Paldam points out that the constant pressure on politicians by the public to spend more and the influence of groups who receive earmarked funds from gambling taxes lets politicians prioritize the goal of tax collection over the goal of addiction prevention. Paldam (2008, 206) concludes with a call for regulation that more effectively addresses the addiction problem, but seems to be indifferent as to whether the regulated

[3] Clotfelter and Cook (1990) and Grote and Matheson (2011) provide overviews of the topics explored in the literature that focuses mainly on the U.S. Theoretical and especially empirical analyses are to be found of who plays the lottery, why people play the lottery, how they respond to changes in the incentive structure of lotteries, what makes the lotto industry peculiar on the supply side, how well suited lotteries are for government revenue generation, how high the tax burden on lotteries is, how earmarking affects the contribution to good causes from other sources, or how regressive the (implicit) taxation via lotteries is. In addition, several papers analyze factors that contribute to the implementation of lotteries by U.S. states from a public choice perspective. Martin and Yandle (1990) argue that the regressive nature of lotteries is used by the politically relatively powerful wealthy voters to distribute funds from the poor to the rich. Other findings suggest that richer states tend to adopt lotteries (Erekson et al. 1999, Hersch and McDougall 1989), that the adoption of a lottery is more likely the higher the burden from taxes is in a state (Filer et al. 1988, Alm et al. 1993, Jackson et al. 1994, Sauer 2001), that the presence of religious groups (Pierce and Miller 1999, Jackson et al. 1994) and the presence of organized interests of other forms of gambling (Wohlenberg 1992, Davis et al. 1992) reduce the probability of lottery adoption, and that the competition of interest groups in favor of and against lotteries affect the legalization of lotteries (Sauer 2001).

providers should be privately or publicly owned. Except for the vague hint that "compromises are easier in this case", because state-owned enterprises "allow both taxation and regulation to be softer and more informal" (Paldam 2008, 204), Paldam neither addresses why a benevolent government could not tackle the addiction problem by regulating either private or public providers nor does he provide a convincing argument for why a non-benevolent government could not satisfy its desire for tax revenues and other stakeholders' desires for earmarked funds by taxing private lottery providers.

Martin and Yandle (1990) make two arguments for why an explicitly non-benevolent government decides to "make" lotteries. First, they point to only low rents that could be taxed if the lottery industry were competitive. However, Martin and Yandle (1990) do not explain why rents would be necessary for taxation. The government could simply tax the lotteries' revenue. Second, Martin and Yandle (1990, 256) argue that a government prefers to provide lotteries itself, because preventing the corruption of gambling activities is "very costly" due to the frequent lack of a "willing plaintiff". Unfortunately, they do not elaborate on the issue any further.[4] As even a non-benevolent government could pursue the goals mentioned by Martin and Yandle (1990) by regulating and taxing one or several private providers, their arguments for why a government would prefer to provide lotteries via its own enterprise fail to convince.

Adams and Tolkemitt (2001) point to negative welfare effects caused by the monopoly status of state-owned lotteries in Germany and argue for a privatization of the state enterprises and a liberalization that allows additional regulated private lotteries to enter the market. Their short welfare analysis does not take the potential addictiveness of lotteries into account and though they mention opportunistic behavior on the part of government as a problem, they do not provide a detailed analysis of the incentives of the members of the major interest groups in the lottery industry in Germany. Fiedler (2016, 495) takes the potential addictiveness into

[4] Also without providing further details, Clodtfelter and Cook (1990, 118) similarly remark that the states' control over lottery operations "has been effective in keeping the games free of corruption."

account and bases his argument against the opening up of the German lottery market for private firms on the addictiveness of lotteries, as he would expect more frequent lottery drawings that would add to the addiction problem. Fiedler (2016) does neither explicitly discuss the possibility of accordingly regulating one or several private providers nor does he discuss whether the current industry structure in Germany may result from less than perfectly benevolent interests of the state governments.

The paper is organized as follows. In section 2, I provide an overview of the trade-offs involved in the provision of a service by government agents versus private agents with regard to innovations unaccounted-for by regulation. In section 3, I analyze the lottery industry and argue for the desirability of private lottery provision. In section 4, I discuss incentives of major stakeholders in the German lottery industry and present evidence from various sources that help to understand why state-owned enterprises provide lotteries in Germany, although private provision would be more efficient. Section 5 contains concluding remarks.

2. State-owned enterprises versus private enterprises

If a benevolent government decides to regulate a particular industry to affect the observed market outcome, it can choose among various forms of regulation. It can leave the market open for competing private providers and regulate them to benefit from the private providers' tendency to provide goods and services more efficiently than state-owned enterprises, which do not have residual claimants who can pocket their monetary profits. Alternatively, the government can write either a contract with a specific private provider or contract with the manager of a government-owned enterprise, while forbidding other private providers to compete.[5] Even a government assumed to be benevolent thereby faces managers

[5] Other possibilities, which are not discussed here, are for the government to share ownership in a provider with private actors (see, for instance, Schmitz 2000) or to add a state-owned enterprise to the ecology of existing private enterprises.

of state-owned enterprises and owners of private enterprises that are less than perfectly benevolent. The government therefore has to take differences with regard to the incentives of private and public agents into consideration when it decides on how to regulate a particular industry.

When the government makes the "make or buy" decision, aspects that can explicitly be taken into account by regulation are not decisive for the relative attractiveness of the provision of a service via private or state-owned enterprises, as with regard to these aspects the regulation secures the same behavior by the provider in the case of private and state-owned enterprises. However, as the future is inherently uncertain, regulation is always incomplete.[6] And when cases of uncontracted-for contingencies arise, it matters who holds the residual rights of control of a provider and thus decides on how the resources of the provider are employed (Hart et al. 1997; Shleifer 1998).

A manager employed by the government who is in charge of the provision of a certain service faces an incentive structure different from the incentive structure faced by the owner of a private provider (or a manager hired by the private owner). Hart et al. (1997) and Shleifer (1998) propose two sources of differing incentives.[7] First, they suggest that managers employed by government have a weaker incentive to make investments in quality that are costly for themselves. Whereas private owners ― potentially after renegotiating the price paid by the government or the consumers ― get to keep a relatively large share of the benefits created due to higher quality, managers of government-owned providers only receive a relatively small share of it. Second, private owners of a provider have a strong incentive to invest in unregulated cost reduction, whereas managers employed by the government benefit only weakly from a reduction in costs. However, cost-reducing investments may deteriorate

[6] Note that in a world in which the government has access to complete regulation private individuals with the same cognitive abilities as government representatives also have access to complete regulation, rendering government provided regulation obsolete.

[7] The analysis by Hart et al. (1997) and Shleifer (1998) of the interaction between a government and a private actor was adopted from the incomplete contracts literature in industrial organization (see, for instance, Grossman and Hart 1986).

the quality of the provided service (Hart et al. 1997; Shleifer 1998). This negative effect on quality is weakened by competition from other providers as the incentive to take effects on quality into account when deciding on investments in innovation increases with competition. (Shleifer 1998, 139). Negative effects on quality that are not compensated for by a reduction in the price of the provided service are therefore more likely the less intense the competition between the providers is.

If a benevolent government considers regulation to be desirable, c*eteris paribus* public provision is more likely to be the efficient mode of provision,

- the smaller the potential for quality improvements unaccounted-for by regulation is,
- the smaller the potential for cost reduction unaccounted-for by regulation is, and
- the larger the negative effect of cost reduction on quality unaccounted-for by regulation and unmitigated by competition is.

It thus depends on the nature of the provided service and the organization of the respective industry whether government provision is preferred over regulated private provision.[8]

I complement the framework proposed by Hart et al. (1997) and Shleifer (1998) by a categorization of various quality aspects of services that allows clarifying under what conditions incomplete regulation is more likely to give rise to the efficient provision of a service by government agents. Three qualitative aspects can be discerned. Some aspects of a service can be learned about by consumers through costly *search* or inspection, other aspects can be learned about by *experience* (Nelson 1970), yet other aspects ― *credence* qualities ― are costly to judge for individual customers even after the purchase and consumption of a service (Darby and Karni 1973). For the sake of argument, I assume that it is prohibitively costly for individual consumers to gather information concerning credence qualities of services.

[8] Note that for the argument at hand it does not matter if the results of government regulation could also be brought about by private regulation, since aspects that can be regulated by the government are not decisive for whether private or public provision is to be preferred. It is also feasible that privately-provided regulation itself is part of the aspects that government regulation cannot account for.

Some search qualities, experience qualities, and credence qualities may be accounted for by regulation. Thus, even credence qualities, which by definition are too costly for individual consumers to inform themselves about, may be accounted for by regulation and are thus not relevant for the relative attractiveness of the provision via public or private enterprises.

The quality aspects that cannot be accounted for by regulation are decisive. For those cases in which unaccounted-for quality aspects are search qualities or experience qualities, private provision is efficient. Individual consumers can punish private providers by not purchasing their services if gains due to unaccounted-for quality improvements and cost-reductions do not outweigh losses from unaccounted-for quality impediments. For those cases in which unaccounted-for quality aspects are credence qualities, private provision is efficient if the gains from quality-improving and cost-reducing innovations outweigh the losses from quality-reducing cost-saving innovations that can neither be prevented by regulation nor by competition between providers. It is thus not surprising that only very few services are efficiently provided by state-owned enterprises.

3. The case for privately provided lotteries

A benevolent government may on the one hand desire to raise revenue from lotteries by taxing them and to leave it open to people to play the lottery. On the other hand, the government may pursue the conflicting goal of protecting lottery addicts. Given the discussion in the previous section, it is far from obvious that in order to achieve any combination of the two goals, the government has to own providers of lottery services. Instead, the government could potentially regulate and tax private providers of lottery services to attain the desired combination of the goals.

I use the incomplete contracts framework suggested by Hart et al. (1997) and Shleifer (1998) to investigate whether private provision or provision by government-owned enterprises

is the more efficient way to offer lotteries. The potential addictiveness of lotteries is commonly cited by governments as justification for the provision of lotteries by state-owned enterprises.[9] In turn, in the economics literature gambling addiction is commonly treated as a negative externality (see, for instance, Paldam (2008) and Fiedler (2016, 210-274) and the literature cited there). Therefore, in my analysis I take it as given that for a small group of players lotteries are potentially addictive and that addiction comes along with negative externalities (in the form of externalities for the addict's future self as well as for other members of society). In addition, I follow Hart et al. (1997) and Shleifer (1998) and for now continue to assume that the government is perfectly benevolent, whereas public agents hired by government and private agents are assumed to only be imperfectly benevolent.

3.1 Quality-improving innovations

Several important quality aspects of lotteries can be accounted for by regulation, among them aspects that have an effect on a lottery's addictiveness. Various quality aspects of gambling services have been shown to affect their addictiveness: availability with respect to time and place, advertisement, price, frequency, size of jackpots, and visual effects are among the identified influences (see, for instance, Adams and Fiedler (2014) for an overview). Most of these aspects can easily be accounted for by regulation and insofar as they can, they are not decisive for the question of whether private or public provision is efficient.

Further, aspects that are credence qualities from the perspective of consumers can also be accounted for by regulation. Two such aspects stand out: the payout ratio and security standards. After taking part in a lottery drawing individual customers can neither tell the

[9] See section 4 for the German case. The lottery industry is obviously not the only industry in which services are on offer that are potentially addictive. Illegal drugs, tobacco, Alcohol, or video games come to mind as goods that are potentially addictive. In Germany and other western-style democracies, all of these are regulated in one way or another. But for the most part governments in these cases do not provide the goods through state-owned enterprises, though there are exceptions, for instance, for liquor that can only be legally bought in state-owned shops.

quality of the payout ratio nor whether a lottery provider lives up to the security standards regarding, for instance, the consumers' personal information it claims to adhere to.[10] If a lottery provider makes information regarding these issues public, the individual consumer has to trust its correctness. The government can easily regulate and monitor the payout ratio and security standards. Private as well as government providers can be required to pay out at least a certain fraction of the lottery proceeds to their customers, to openly communicate the payout ratio, and to adhere to certain security standards.

Some quality aspects of lottery services can be assessed by lottery customers through search and experience, though they cannot be accounted for by regulation. Entirely new lottery offers that add to the customers' welfare are imaginable and existing lotteries can invest in the improvement of their consumers' experience along many dimensions. For instance, they can increase the attractiveness of their points of sale, they can improve the presentation of the drawings, they can train their staff, they can simplify the purchase transaction, or they can improve upon their websites. As consumers can learn about these quality improvements either by search or by experience, private lottery providers have an incentive to invest in such improvements.

Such unaccountable-for quality-improving innovations are beneficial for the large group of non-addicted lottery players. However, whereas lottery addicts on the one hand benefit from the quality improvements just like non-addicts, some of these unaccountable-for quality-improving innovations may be harmful for the small group of (potential) lottery addicts as they add to the lotteries' addictiveness.[11] The innovations may increase the likelihood that an individual develops an addiction or make an addiction more severe. Quality-improving innovations that are unaccountable-for by regulation may therefore either

[10] The regulation that accounts for security issues in the lottery industry does not have to be lottery-specific. Regulations that require banks and non-banks to protect their customers' data could apply to firms in the lottery industry, too.

[11] The addict's harm here is short for negative externalities the addict imposes on his future self as well as on other members of society.

benefit or harm (potential) addicts.[12] Their net effect on (potential) addicts is theoretically indeterminate.

3.2 Cost-reducing innovations

The regulation of cost aspects is less straightforward than the regulation of quality aspects. Whereas setting minimum standards for select quality aspects may be individually meaningful if lottery consumers regard different quality aspects as perfect complements for one another, setting maximum standards for select cost aspects may not often be meaningful.

Regarding quality aspects, keeping the price of a lottery ticket constant, a decrease in, for instance, the payout ratio cannot always be compensated by an increase in the level of security. That is less likely to be the case for cost aspects. What customers are most likely concerned about when it comes to the cost structure of a lottery provider is the effect of total cost on the price of lottery tickets. In other words, different cost aspects for lottery customers are unlikely to be perfect complements. Keeping total cost and quality aspects constant, from the point of view of lottery consumers a cost increase in, for instance, the procurement department can be perfectly compensated for by a corresponding cost decrease in, for instance, the marketing department of the lottery provider. The two then are perfect substitutes for one another.

Whereas meaningful cost-related regulation is therefore hard to imagine, the potential for cost-related innovations that cannot be accounted for by regulation is vast. The advent of new technologies continually gives lottery providers opportunities to restructure their internal organization and the interaction between them and their customers and suppliers. In addition, innovative lottery providers are likely to find many ways to cut the cost of providing their services by reorganizing their internal affairs, by adapting the interaction with their customers, by making themselves "make or buy" decisions, by changing their human resource

[12] Keep in mind that major aspects that affect addictiveness can be accounted for by regulation.

strategy, or by bringing in outside advisers. The list offered here is obviously not complete and merely serves the purpose to demonstrate that the potential for cost-reducing innovations, which have to remain unaccounted-for by regulations, are vast.

As long as these unaccounted-for cost-reducing innovations do not affect the quality of the service, they benefit non-addicted players via lower prices for the lottery services. Those players who are (potential) addicts may benefit from the reduction in price as they can ease their urge to play at a lower price, they may not be affected as they derive the same utility by continuing to spend the same fraction of their budget on lotteries, or they may be harmed as the lower prices lower the entry barrier to the addictive activity. The net welfare effects via (potential) addicts thus remains unclear.

3.3 Quality deterioration through cost-reducing innovation

The extent to which cost-reducing investments may have negative unaccounted-for effects on the quality of lottery services appears to be small. Major quality concerns that do or do not influence the addictiveness of lotteries can effectively be dealt with by regulation. Negative effects on quality are further mitigated as customers can search for or experience them and are thus in a position to punish a provider by taking their business elsewhere ― to another lottery provider or to a non-lottery provider.

Quality aspects the government may be particularly concerned about, because they represent credence qualities are the payout ratio and security aspects. As discussed above, both can be effectively addressed by regulation.

There may be remaining negative effects on quality that cannot be accounted for by regulation and cannot be mitigated by competition. But it appears that the potential for such unregulated quality reductions that stem from cost-savings is rather limited in the lottery industry. If they do occur, they hurt non-addicted lottery players, while they may on net

benefit or harm (potential) lottery addicts who may find the lottery to be less appealing but also less addictive.

Table 1 summarizes the effects of private vs. government provision of lottery services that stem from a stronger incentive of private providers to innovate in circumstances that regulation cannot account for.

Table 1
Innovations unaccounted-for by regulation:
Social welfare effects for regular lottery players and (potential) addicts from private vs. government provision

	Effects on large group of regular players	**Effects on a small group of (potential) addicts**
Quality-improving innovation	Large net social benefits	Net social effect theoretically undetermined
Cost-reducing innovation	Large net social benefits	Net social effect theoretically undetermined
Cost-reducing innovations with negative quality effects	Small net social losses	Net social effect theoretically undetermined

In sum, the preceding discussion indicates that private agents are the efficient providers of lottery services. The large group of non-addicted lottery players benefits from the relatively strong incentives of private providers to innovate to improve quality and reduce costs in the case of contingencies not accounted-for by regulations, while the direction of the net social welfare effects on the small group of (potential) addicts remains indeterminate.

4. The Political Economy of state-provided lotteries in Germany

The preceding analysis indicates that the private provision of lottery services is efficient. Therefore, benevolent governments should not provide lottery services through state-owned enterprises. Nonetheless, governments in many countries do just that. In principle, two explanations of this apparent contradiction are feasible. Either the preceding analysis is deficient and lottery services are, in fact, efficiently provided by state-owned

enterprises or the acting governments are not primarily motivated by benevolence towards lottery players and other members of society but rather pursue their own interests through state-owned lottery enterprises. To contemplate the latter explanation I drop the assumption that members of government are perfectly benevolent and investigate the provision of lotteries by state-owned enterprises in Germany. I analyze the incentives of members of government, managers and employees of state owned-lottery firms, and private vendors who provide sales services to the state-owned lottery firms

Lotteries have been used by governments to raise revenue at least since the late Middle Ages (Willmann 1999, Martin and Yandle 1990). Today, state-owned lotteries either transfer their profits to the states' coffers (as in the U.S.) or contribute to the states' budget primarily by paying fees and taxes, though the states are the sole owners of the lottery enterprises (as in Germany). It is common that at least a fraction of the receipts from lottery revenues is earmarked for the use for so-called "good causes".

The government revenue from state-run lotteries in Germany is substantial and amounted to roughly 2.7 billion Euro in 2015 that entered the budgets of the German *Länder*.[13] In Germany, all 16 *Länder* own regional lottery enterprises with monopoly privileges enforced by government. In most cases, a fraction of the revenue from the lottery enterprises is earmarked for the use for good causes, such as sports, the Workers' Welfare Association, music, or theatres.[14]

The 16 state-owned lottery enterprises are themselves partners in a joint association (Deutscher Lotto- und Toto-Block) that they use as judicial vehicle to pool the revenues from the sale of lottery tickets and to allocate the gains according to uniform quotes. Thereby,

[13] I gathered data on the revenue of the state-owned lottery enterprises from the states' budgets, the annual reports of the lottery enterprises, and the Federal Gazette (*Bundesanzeiger*).
[14] For the U.S., Jones (2015, 906) states that all revenue from lotteries was earmarked for education spending in 20 out of 43 U.S. states that sponsored lotteries in 2014, while in some additional states a fraction of the revenue was earmarked for education. For the case of Germany, I could not find any information on earmarking of funds from lottery enterprises in the state of Bavaria and the state of Mecklenburg-Western Pomerania.

individual state-owned lottery enterprises enter contracts with the lottery players, not the vehicle association (Ohlmann 2002, 355).

Since 2004, the 16 *Länder* repeatedly signed agreements to unify the rules pertaining to gambling across the *Länder*. The fundamental goals formulated in the first paragraph of the various versions of the agreement (2004, 2008, and 2012) nearly all speak to the protection of (potential) gamblers:[15]

- Gambling addiction should be prevented.
- The human urge to gamble should be channeled into orderly and monitored forms of gambling.
- Youth protection and gambler protection should be guaranteed.
- Gambling services should be provided lawfully and gambling-related crimes should be prevented.

All three versions of the agreement among the *Länder* charge them with the task to guarantee a "sufficient" supply of gambling services and stipulate that they can provide such services themselves individually, jointly through a public-law institution (*öffentliche Anstalt*), via corporate bodies organized under public law (*juristische Personen des öffentlichen Rechts*), or companies under private law (*privatrechtliche Gesellschaften*) in which corporate bodies organized under public law hold a substantial share (see, for instance, Glücksspielstaatsvertrag 2012, § 10). The governments of all the 16 *Länder* decided to provide lottery services through entirely state-owned enterprises equipped with monopoly privileges.

4.1 State governments

[15] The legal formulations of the goals can be found in the first paragraphs of the Staatsvertrag zum Lotteriewesen in Deutschland 2004, Glücksspielstaatsvertrag 2008, and Glücksspielstaatsvertrag 2012.

The agreements among the *Länder* do not mention tax revenue as a goal. Nevertheless, all of the versions do state that a substantial fraction of the revenue from gambling services should be used for public or common, ecclesiastical, or charitable purposes. However, as only a relatively small part of the lottery-related revenue is earmarked (about 26.4 % in 2015), it is obvious from the conduct of the *Länder* governments that they also aim at raising revenue for their general budgets.[16] There are further examples that suggest that the state governments in Germany do not uncompromisingly prioritize the goal of player protection over realizing revenue from lotteries: The state-owned lottery firms purchase sales services from private vendors (see section 4.3) that have high-powered incentives to sell additional lottery tickets. The state governments allow the state-owned lottery firms to sponsor professional sport teams. The state governments did not prevent the drawing of the lottery to occur during prime time on TV and the state-owned lottery firms use offline and online marketing tools to attract customers.[17]

Reference to the goal of tax revenue alone does not explain why imperfectly benevolent state governments would provide lotteries via state-owned enterprises. As argued in section 3, the state governments could attain their other official goals *and* raise revenue by taxing and regulating private lottery providers.

Instead, the state governments may have an interest in state-owned lottery businesses due to goals of a less noble nature that help to explain the persistence of state-owned lotteries. Shleifer and Vishny (1994) argue that politicians may have an interest in maintaining state-owned enterprises to be able to influence the operations of the government-owned firms to

[16] I gathered information on the allocation of lottery-related revenues within the states' budgets from the annual reports of the lottery enterprises, state budget reports, and further sources provided either by the states or the lottery enterprises.

17 From 1965 to 2013, lottery drawings were broadcasted on public television, first once a week on Saturdays and from 1982 to onwards also on Wednesdays (Beckert and Lutter 2008, 237; Staatliche Toto-Lotto GmbH Baden-Württemberg 1998, 103). Since July 2013, live drawings of the lottery numbers have been broadcasted on the internet.

their personal advantage. I focus on two potential sources of advantages for the state governments that come along with maintaining state-owned lottery enterprises.

First, elected politicians may use their power to influence the hiring decisions of state-owned enterprises in political exchanges. Such political exchanges between politicians and candidates for public jobs are known in the political science literature as either "clientelism" or "patronage", where the two terms are often used interchangeably.[18] Several empirical investigations find evidence for the political use of public employment (see, for instance, Enikolopov 2014; Alesina et al. 2000; Alesina et al. 2001; Lopez-de-Silanes et al. 1997, Folke et al. 2011). Ennser-Jedenstaik (2014) provides evidence for state-owned enterprises in Austria that suggests a close relationship between the partisan composition of the federal government and the appointment of party loyalists of individual parties to the managerial boards of state-owned enterprises.

Similarly, politicians who are members of state governments in Germany may be able to use executive positions in the state-owned lottery enterprises either to reward a party loyalist or to improve their own control over the lottery enterprise.[19]

As of the end of 2016, there were 23 people on the management boards of the 16 state-owned lottery firms. In seven cases, two individuals represent the management (*Geschäftsführung*). Eight of the 23 worked in the political sphere ― narrowly defined as administrative governmental units ― before taking the job on the management board of one of the state-owned lottery companies. The eight individuals who had been employed in the narrowly defined political sphere mostly worked in ministries prior to joining the lottery firms. A broader definition of the political sphere includes state-owned firms. Fourteen of the 23 individuals before becoming managers of state-owned lotteries had employers that

[18] Sometimes patronage is regarded as a form of clientelism that relates to transactions in which public jobs or the benefits from public office are exchanged. And sometimes clientelism as a form to attain (electoral) support by using public resources is seen as distinct from patronage that denotes the use of public resources for the benefit of a particular organization, for instance, a party (for discussions of the two terms see, for instance, Hicken 2011; Kopecky and Mair 2012).

[19] Kopecky and Mair (2012) differentiate between these two motivations for acts of patronage.

qualify as elements of this broader political sphere, to which I also count firms such as state-owned banks or other state-owned lottery enterprises. It is not too disturbing that a large share of the management positions were given to individuals with experience in the political sphere, as such experience can be regarded as qualification that is helpful in managing a public enterprise.

Table 2
Members of the management boards of the 16 state-owned lottery enterprises as of December 2016:
previous employment and party affiliation

Number of managers	23
With previous employment in the narrow political sphere (governmental administrative units, such as ministries)	8
With previous employment in the broader political sphere (the narrow political sphere plus state-owned enterprises, such as banks or lottery enterprises)	14
With party affiliation	7
With party affiliation selected by a government in which their own party was represented	6

Note: I gathered the information from various sources available online, such as press releases, newspaper articles, annual reports, CVs, and personal professional business network platforms. Managers for whom I could not find any signs of a party affiliation are assumed not to be affiliated with any party.

Table 2 also contains information on the party affiliations of the CEOs of the state-owned lottery enterprises. Interestingly, seven individuals ― all of them with former employment in the narrow political sphere ― had affiliations with parties. Of these seven individuals with party affiliations, six were selected to the management board by governments in which their own parties were represented. Whereas experience in the political sphere may count as a crucial qualification, party affiliation surely does not. Therefore, although the total number of current CEOs with party affiliation is only about 30 %, the fact that 86 % of these were hired by governments in which their own parties were represented suggests that they were rewarded for their party affiliation. Despite the low number of observations this further

suggests that patronage does play a role in the hiring process for management positions in state-owned lottery enterprises.

Second, the members of state governments may also benefit from a cooperation between the government and government-owned lottery enterprises, which can be expected to be closer than the cooperation between the government and privately owned lottery providers. Such a cooperation may come in the form of joint events that a state-owned lottery enterprise co-finances by using funds that are neither earmarked for special purposes nor enter the state budget directly, but are expenses of the lottery enterprise. The cooperation may also come in the form of financial support via sponsorship for a project that the state-owned lottery enterprise as well as the state government consider worthy of support, but which would have received less support by the state-owned lottery enterprise had it not been for the interest in support voiced by the state's government. These are not illegal forms of cooperation, yet if they take place none of the parties has an interest to publicly announce that the budget of the state-owned lottery enterprise is to some extent used to finance activities that the government could also have financed via its budget directly, but preferred not to. Therefore, it is unsurprisingly difficult to find evidence for such behavior. Some relevant information is nonetheless available.

To varying degrees, the *Länder* provide information on sponsoring from which they benefit, who the sponsors are, and what the means are used for. For instance, from 2007 to 2015 the state of North Rhine-Westphalia regularly received funds ranging from 15,000 Euro per year to 23,000 Euro per year from its own lottery enterprise in its role as sponsor of an annual festivity organized by the state's government.[20] Another example is provided by the state government of Hesse. In 2014, it organized an annual reception of the Hessian state government in Brussels and its own lottery enterprise was among the sponsors of the event

[20] 2008: 15,000 Euro, 2009: 20,000 Euro, 2010: 23,000 Euro, 2011: 23,000 Euro, 2012: 21,500, 2013: 15,000 Euro, and 2015: 20,000 Euro. (Landesregierung NRW)

(Hessischer Landtag 2015).[21] Again, an example from North Rhine-Westphalia illustrates that state-owned lottery enterprises may be used to finance activities that could be financed by the states' budgets directly. In February 2015, the state's parliament held carnival festivities in honor of carnival celebrities and the state-owned lottery enterprise provided sponsoring for the event amounting to 12,500 Euro (Landtag NRW 2015).

As owners of the lottery enterprises, the state governments could in these cases have transferred the funds into the general budget of the state. The fact that they had their own enterprises to post as sponsors of their activities suggests that they prefer this sponsorship model, possibly because it leaves them more budgetary flexibility.

These anecdotes on which the respective state governments themselves provided detailed information only involve relatively modest amounts. Unfortunately, the state-owned enterprises do not make public any detailed information concerning their expenses that would allow to identify the use of funds for activities in which the state governments participate. Given the incentives of members of the state governments posited here, the state governments also do not have any interest in requiring such a degree of transparency from their own enterprises.

4.2 Managers and other employees of state-owned enterprises

The employees of state-owned enterprises, including their managers, are not the ones who decide whether a state-owned enterprise or a private enterprise provides a certain service. However, once they are employed by a state-owned enterprise, they may serve as sponsors of the status quo and may, for instance, favor the going concern of the enterprise as a government enterprise, support measures that limit the competition for the state-owned enterprise, or argue for an expansion of the activities of the enterprise. In principle, managers and employees of state-owned enterprises could also be proponents of change towards the

[21] The provided information only reveals that a group of five sponsors provided sponsoring amounting to 18,500 Euro.

provision of the respective service by private enterprises and argue in favor of privatization, elimination of barriers to market entry, or the downsizing of the enterprise's scope of business activities. Casual observation, however, suggests that managers and employees of state-owned enterprises prefer the conservation of the enterprise's privileged status.

Besides the obvious interest of managers and employees to neither terminate the state-owned enterprise's business nor open the market for competing private businesses, I stress two advantages that managers and employees potentially enjoy from the going concern of an enterprise as a state-owned enterprise.

First, managers of state-owned firms are the agents of principals who represent the government. The members of government in turn cannot personally claim the monetary residuals of the state-owned enterprise's activities, although they do benefit to some extent from the revenue (and the profit) of the enterprise. However, the incentives for the members of government to bargain with and monitor the activities of managers of state-owned enterprises is less pronounced than in the case of private owners of an enterprise who employ a manager as their agent.

Managers may therefore be able to negotiate a more attractive remuneration package with a state-owned enterprise than with a privately owned enterprise. Such a remuneration package may entail a particularly attractive salary, but may also be composed of access to other amenities, such as contributions to retirement provisions, a modest workload, or opportunities for self-presentation. In addition, managers of state-owned firms may have more room for opportunistic behavior. For instance, they may support projects that they favor, hire individuals they appreciate working with, or maintain amenities they have a particular liking for, but are not the most conducive for the proclaimed goals of the state-owned enterprise.

Second, the employees of state-owned enterprises outside the management team may also benefit from a remuneration premium that would not be available to them if either the

enterprise was privatized or the market was opened for private competitors. There is evidence that employees of formerly state-owned enterprises were compensated, for instance in the form of shares in the established private enterprise, for their losses in income and other benefits to gain their support of the privatization of their employer (Dewenter and Malatesta 1997; Vickers and Yarrow 1991). Further, there is evidence for the U.S. that following deregulation earnings premiums in trucking, airline, and telecommunication industries fell (Peoples 1998). There is similar evidence from Japan for taxi and bus drivers following product market deregulations (Kawaguchi and Mizonu 2011).

Although there is no empirical evidence specifically for the lottery industry, the evidence from other highly regulated industries suggests that upon deregulation or privatization the employees of those industries had to suffer from salary reductions. Therefore, it is reasonable to expect that the employees of the state-owned lottery firms have an interest in campaigning for the preservation of their employer's legal status and its privileged competitive situation.

4.3 Private lottery vendors

While the states' lottery firms also provide lottery services online, to buy physical lottery tickets consumers in Germany have to frequent shops of private vendors. There are more than 24,000 licensed retail outlets. The interests of the private vendors are represented by an association (*Bundesverband Lotto-Toto-Verkaufsstellen Deutschland e.V.*) that in turn is represented by associations at the state level of which individual private vendors can be members. 10,000 private vendors are organized as members in 13 regional associations at the state level.[22]

The states' lottery enterprises decide whether a particular applicant receives a license to sell lottery tickets at a certain destination. Besides the applicant's credit rating, criminal

[22] As of April 2017, there are no such regional associations in Mecklenburg-West Pomerania, Saxony-Anhalt, and Brandenburg.

record, and business plan, the states' lottery providers take into account how many retail outlets are already established close to the location the applicant wants to open a point of sale at.

Just as the employees of state-owned lottery enterprises, the private vendors who contract with the state-owned lottery firms do not decide whether the structure of the lottery industry is changed, but they may exert some influence either towards conservation or towards change of the industry's makeup.

The state-owned lottery enterprises currently are monopsonists in the market for lottery ticket sales services. The interest of the private vendors with regard to a change in the rules of the market for lottery services are less clear cut than in the case of the state government and the managers and employees of state-owned lottery enterprises.

If the current state-owned lottery enterprises were simply privatized, the private vendors would still be faced with a monopsonist when they negotiate the commission for the sales services they provide to the lottery enterprise. A private owner cum residual claimant would have a stronger incentive to make use of the enterprise's monopsony power, but would also have a stronger incentive to make the lotteries more attractive. Thus, the private vendors may or may not have an interest in keeping the monopoly in the hands of a state-owned enterprise rather than in the hands of a private enterprise.

If the relevant alternative would be to open the market to competing private lottery providers, the interests of the group of the current private lottery ticket vendors is also unclear. On the one hand, they would benefit from being able to negotiate with lottery enterprises, none of which has monopsony power. Therefore, if they currently suffer from the state-enterprise's making use of its monopsony power, they may potentially gain from elimination of market entry barriers on the market for lotteries. On the other hand, the private vendors could themselves suffer from additional competition by new lottery ticket vendors. Currently, the state-owned lottery monopolists control the number of vendor licenses and the

private vendors hold regional monopolies with modest monopoly power for the physical sale of lottery tickets, although they are not free to set the price of a lottery ticket. If additional lottery enterprises entered the market and relied on firms for the physical distribution of their lottery tickets who would be free to open up points of sale in proximity of the locations of the current private vendors, the current private vendors could lose business.

If private vendors are risk-averse and the outcome of a considerable change in the structure of the lottery industry is uncertain, they may well have an interest in lobbying against considerable changes in the lottery industry, independent of whether a privatization of the state-owned lottery enterprise or the opening-up of the lottery industry for private competitors is discussed.

In a hearing before the budget and finance committee of the state parliament in North Rhine-Westphalia in 2016 on the topic of the comprehensiveness of the network of lottery vendors across North Rhine-Westphalia, the representative of the association of private lottery vendors in North Rhine-Westphalia argued in favor of an increase in the remuneration that the vendors receive for their sales services, but did not mention the possibilities of privatization or of opening the lottery market for private competitors (Landtag Nordrhein-Westfalen 2016). The fact that a representative of the vendors' association did not argue for a drastic change of the industry's monopolistic structure, but rather for a change in the distribution of revenue along the industry's value chain, provides at least some evidence that the current vendors do not expect to massively benefit from considerable changes to the lottery industry's structure.

5. Conclusion

As only aspects that cannot be accounted for by regulation determine whether public or private provision of a service is efficient, private enterprises should not face insurmountable legal barriers to offer lottery services. I show that a benevolent government, which addresses potential negative welfare effects due to the lotteries' addictiveness by

regulation, would leave the provision of lottery services to taxed private providers to make sure that lottery players can benefit from the high-powered incentives of private providers to innovate to increase quality and reduce costs. Further, if the only goal of a less than perfectly benevolent government was to raise more than the efficient amount of tax revenue through the lottery industry, they still could attain their goal by taxing private providers. The fact that in most countries state-owned lottery enterprises equipped with monopoly privileges provide lotteries therefore suggests that governments use these enterprises as vehicles to pursue some of their own interests beyond the goal of raising tax revenue.

My analysis of the lottery industry in Germany points to various potential narrow self-interests of influential stakeholders in the lottery industry ─ members of the state governments, managers and employees of the state-owned lottery enterprises, and private vendors who provide sales services to the state-owned lottery firms ─ that help to understand the current structure and why it persists. These interest groups, whose members tend to be well-informed about the specifics of the lottery industry and well-organized, appear to realize benefits from the government provision of lotteries to the detriment of the large group of badly-informed and badly-organized lottery players.

An interest group that has received only little attention in my analysis, but is found to have a major impact on the lottery structure in Denmark by Paldam (2008), are the organizations that benefit from the state lottery revenue that is earmarked for good causes. The reason for the relative neglect of the beneficiaries of the earmarked funds here is that earmarking of the state's revenue from the provision of lottery services may occur independent of whether the government provides lotteries itself or leaves the provision to private firms. The privatization of state enterprises or the opening-up of the lottery industry would not prevent the state governments from continuing their current earmarking practices.

Due to the risk of gambling addiction, the provision of lottery services is a peculiar business. My analysis nonetheless points to an efficient provision of lotteries by private

firms, because aspects of lotteries that affect their addictiveness can to a large extent effectively be taken into account by regulation. Therefore, the provision of other services ─ including some that are currently regularly provided by governments or state-owned firms ─ that lack any peculiarity due to addictive effects are most likely also efficiently provided by private firms. Besides a broad range of utility services, German government entities own enterprises that offer banking services, beer, transportation, logistics, and other services. In depth analyses of such activities and the incentives of the involved stakeholders would make for attractive complements to this study of Germany's lottery industry.

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