Clean Slate Proclamations, The Jubilee, and Anti-Monopoly Laws[*]

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Abstract

In this paper we suggest a new view that treats clean slate proclamations, such as the Biblical Jubilee, as anti-monopoly laws. We demonstrate the appropriateness of this approach by considering the institutional details of clean slate proclamations in general, and of the Jubilee in particular. We develop a model that demonstrates that the requirement to return purchased agricultural land to its original owner can serve as a second-best solution to excessive market concentration in the presence of imperfect capital markets.

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Introduction

A “clean slate” is a proclamation, made by a king, ruler or general, under which any land sold because of economic distress is returned to its original owners, anyone forced into servitude by debts is liberated, and back debts are cancelled. The most famous of these proclamations is the Jubilee as recorded in the Bible. However, such laws pre-date the Bible, which, according to the Biblical timetable was given to Moses in the year 1313 BCE.

According to Hudson (1999), the earliest clean slates were proclaimed over 1000 years earlier. The oldest surviving clean slate was proclaimed by Enmetena, “who ruled the Sumerian city-state of Lagash from about 2404 to 2375 BCE,” and about 50 years later, in 2350 BCE, by his successor, Urukagina. In about 2200 BCE another Sumerian ruler, Gudea, also “remitted debts” and returned ancestral land.

A hundred years later, Nammu, the ruler of Ur issued a clean slate, as did his son, Shulgi. Between 2000 and 1800 BCE clean slates were proclaimed by the Babylonian and Amorite dynasties in Isin and Larsa, and by two Assyrian rulers. Hammurabi proclaimed clean slates in 1792, 1780, 1771 and 1762 BCE, and “six consecutive rulers of Hammurabi's dynasty also cancelled debts during the following 166 year period.”

The Biblical Jubilee is believed by some to have been decreed by King Zedekiah of Judah (596-587 BCE) and by Nehemia (444 BCE). The forgiving of debt later became a widespread phenomenon, and was even used as a tactical device by Greek and Roman generals. These clean slates were given soon after conquering an area in order to win widespread support among the peasants for the conquering forces. Finally, the Rosetta stone, which is best known for having given scientists the key to unlocking hieroglyphics, is no more than a clean slate proclaimed by Ptolemy V (Egypt, 204-180 BCE).

As discussed below, in most manners clean slates and the Jubilee were quite similar, both with respect to the details of the proclamations and with respect to the circumstances they were meant to address. There is, however, one important distinction between the Jubilee and other clean slates. Most clean slates were decreed by a ruler, with both the timing and the details of the clean slate subject to the ruler's whims. In the Jubilee, however, the timing and details were predetermined, occurring exactly once every fifty years. The economic implications of this difference will be discussed below.

Despite the fact that many scholars believe that the Jubilee was never carried out,[1] we nevertheless use the specific details of the Jubilee to try to shed light on the *raison d'être* of clean slate proclamations. Our analysis focuses specifically on the Jubilee for two reasons. First, the Jubilee is the clean slate about which the most institutional information is available, and since, from the information available, these institutions seem not to be greatly different in other clean slates, the results should be representative. Second, we view the 50-year rule of the Jubilee as the determination of a fundamental tradeoff between fixed and variable intervals between proclamations. In particular, while a variable interval allows flexibility, it leads to uncertainty on the part of sellers and buyers. Given that, as mentioned above, the Jubilee was enacted more than a millenium after the initial inception of clean slates, we believe that a fixed period between clean slates was chosen for the Jubilee because the uncertainty in previous clean slates resulted in too much inefficiency.

Our contention in this paper is that the existing justifications for clean slates and the Jubilee are insufficient to explain some of the anomalies of the decrees. If, however, we consider the prospect that these proclamations serve also as anti-monopoly laws, some of the details of the proclamations are better understood, and a clean slate is then seen to be a fitting response to the economic dearth of that period.[2]

The paper proceeds as follows. In Section I we present the main edicts of clean slates proclamations and Jubilee laws. Section II presents the various justifications that have been given for the enactment of such laws, and presents the new justification that ties these laws to market concentration concerns. Section III contains a general description of the anti-monopoly approach, and Section IV models this approach. Section V presents a numerical example in which we derive the expected optimal length of time between clean slate proclamations. Section VI concludes.

I. Clean Slates and Jubilee Laws

Consider the economic situation that existed throughout most of the post-Neolithic history of mankind. Until the industrial revolution, society was, for the most part, agrarian. The production of food took up most of the world's resources, with numerous periods when even these resources were grossly insufficient. Land was the

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[1] See, for example, Westbrook (1991) and Fager (1993).

predominant factor of production, and as such was unparalleled in its importance for the economy. For cultural, economic and political reasons, owning land was of the utmost importance, and ownership was generally widely dispersed. However, levels of production on land were highly unstable, and most of the population lived close to subsistence levels. Landowners who experienced slack production could find themselves in destitution, and could be left with no choice but to sell their lands to avoid debt. At times things became so desperate that they even sold themselves or family members into servitude because of heavy debts. Thus, as described in the Bible, land was sold primarily when the landowner became destitute (as explained in Milgrom, 1999).

Over time a high degree of concentration in land-ownership ensued because there were few who were sufficiently wealthy to purchase land and slaves. This concentration had dire effects on the economy, with the majority of the population becoming dependent on a small minority of people. This was particularly true because the cost to trade most agricultural goods internationally was prohibitive, leading to local market segmentation. This led to a lack of both economic and political freedom for most of the population, as the few determined prices, wages and status as a direct result of their controlling the productive resources, and not simply as a result of their being rich. Even if times improved, the new owners had no incentive to sell these lands back to their original owners.

Consider now the Jubilee, or the clean slate proclamations discussed above. One of the main decrees of the Jubilee is that land sold during the previous 50 years must be returned to its original owners, without any compensation.[3] Thus, the Bible states:

> "When your brother becomes impoverished and has to sell his holding, his closest redeemer shall come and redeem the sold property of his brother … If he does not acquire sufficient means to recover it, his sold property shall remain with its buyer until the Jubilee year; it shall be released in the Jubilee, and he shall return to his holding." (Leviticus, 25, 25-28).

However, not all land falls under this decree – only agricultural lands are returned during the Jubilee. Real estate and property held in cities, for instance, was not returned to its original owner – the purchaser was permitted to hold on to it for eternity. This, according to Hudson (1999) was true also of other clean slate

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[2] A simple exposition of this concept was developed in Rosenberg and Weiss (1999).

[3] As will be discussed below, since the date of the return of the land is known from the start, purchasers are not harmed by this decree, since this is taken into account in the purchase price of the land.

proclamations. In other words, it is the productive aspect of the land that was of concern, and not ownership per-se. A closer look at the laws of the Jubilee, as discussed below, strengthens the perception that clean slates deal primarily with factors of production.

The major biblical decrees pertaining to the Jubilee are:

1. Any agricultural land must be returned to its original owner; even if the land has passed through several hands it is returned to the first owner.[4] If, however, the land was donated for the use of the sanctuary, it is not returned to its original owner. In addition, if the sanctuary then sold the land, it returns to the sanctuary during the Jubilee. Also, agricultural lands could be redeemed by their original owners at any time for a price equal to the expected production until the Jubilee.
2. Houses on agricultural land are treated in the same manner as the land. Houses in walled cities, however, are not treated such;[5] rather the original owner has one year within which to redeem his house. If the house is not redeemed within a year, it is not returned to the owner.
3. All Jewish slaves are released.[6]

II. Justifications for the Jubilee and other clean slates

It is generally believed that the main goal of the Jubilee was sociological – to achieve a certain degree of equality among people.[7,8] In the case of clean slates other than the Jubilee, supplementary justifications are often given. These range from a benevolent ruler, interested in helping the poor masses devastated by the cruelty of

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[4] According to Hudson (1999), in other clean slates "[t]hey restored the crop rights of indebted cultivators who had forfeited or sold their usufruct rights under economic distress."

[5] This is almost identical to what occurred in other clean slates, in which, according to Hudson (1999) "most houses in towns were in a different category. Urban houses and orchards in the commercial sphere were exempt from these royal edicts, which were primarily intended to protect the basic self-sufficiency of small landholders."

[6] According to Hudson (1999), in other clean slates only bond servants were released, while "outright slaves, mostly women and girls who had been captured by force, were not freed; they were returned to the debtors who had pledged or forfeited them, along with the debtors' wives, daughters and sons. Families were thus reunited, slaves and kin together." This is similar to releasing only Jewish slaves rather than all slaves in the Jubilee.

[7] Another view, applicable to the Jubilee alone, is that the Jubilee is a reminder that the world was created by, and thus belongs to, G-d. Since this is so, the division of land to the different tribes should remain as divided by Joshua: slaves should be freed since we are all "slaves to G-d and not slaves to slaves" (of G-d); and the land should be rested during each seventh year, just as the Lord rested on the seventh day of creation. This explanation suffers from many of the same shortcomings as does the sociological explanation, as discussed in the text.

nature,[9] to strategic implementation in order to appease residents of a conquered land[10] or to limit the political strength of wealthy landowners.[11]

In considering the sociological view (or the theological view of the Jubilee discussed in footnote 6) several difficulties arise. Why differentiate between land and houses? Why differentiate between houses in cities and those outside of cities? In fact, why not demand the return of all durable goods sold? Why don't sanctified lands return to their original owners? The ancillary justifications suggested above may have merit on a case by case basis, but they surely cannot help us understand the general and widespread phenomena, and are certainly irrelevant when considering the Jubilee.

In this paper we take a different view, which should be perceived as complementary to the other explanations, and which can be useful in understanding some of the anomalies. We believe that some of the aspects of the clean slate proclamations, and particularly the Jubilee laws, are best understood when perceived as analogous to current-day antitrust laws.[12] Two alternatives to this approach can be taken. The first alternative is to say that the 50-year decree of the Jubilee is simply a Biblical estimation of how much time should be allowed to pass before action is taken. Under this interpretation, the economic damage from increasing concentration is expected to become dire enough to warrant intervention after fifty years.

However, consideration of the facts leads us to another possibility.

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[8] Note that the Jubilee is not seen as a means of keeping the distribution of lands between the twelve tribes of Israel constant, because, if this were the goal of the Jubilee, there would be no reason to return the land when sold to someone within the same tribe.

[9] Thus, Hudson (1999) states that "[d]ebt arising from economic distress – crop failure, drought and other "acts of God" – created antiquity's most serious economic distortions because of the interest charges that they accrued … As debt claims grew more rapidly than herds, barley output or other economic activity, usury became the major lever by which absentee owners monopolized the land, drove off its inhabitants and reduced many to bondage… Rulers sought to counter corrosive effects of debt … It was recognized as inherently necessary, at least occasionally, to enable cultivators who lived on the margin of subsistence to bridge the gap between income and expenditure … In sum, these royal edicts did not cause problems, they solved them – by restoring the presumably normal pre-debt state of affairs. They preserved widespread self-sufficiency on the land for its customary holders." He also claims that these edicts were upheld, and that "there are records of lawsuits brought by former landholders against creditors who refused to hand back the subsistence plots that were supposed to be returned to their original, pre-debt owners.

[10] According to Hudson (1999) "(Tacticus) recommended that a general who was attacking a town should promise to cancel debts owed by its inhabitants if they defected to his side," and "In early Rome Coriolanus promised to cancel the debts of men who joined him in defending the city."

[11] As Hudson (1999) states "They rendered forfeiture of land and family members only temporary, recognizing that irreversible transfers would have allowed absentee landlords to evolve into a permanent wealthy aristocracy."

[12] Note that our theory deals with the return of factors of production only, and not with respect to other Jubilee decrees, such as debt forgiveness. Thus, for instance, we do not discuss Hillel's Prozbul, which was instituted as a way of bypassing the debt forgiveness edicts of the Jubilee.

Considering that it is the rich who are acquiring the land, it is quite plausible that the purchasers are able to put the land to better use than the sellers, simply because they have the resources to work the land and invest in the land in a more efficient manner. Under this assumption, we demonstrate that the requirement to return purchased agricultural land to the large number of original owners in the Jubilee can be viewed as a second-best solution to excessive market concentration in the presence of imperfect capital markets.[13] Whichever of these anti-monopoly alternatives one adopts, these proclamations are then given the interpretation of being concerned with the size of the pie rather than merely with the distribution of the pie. In other words, the law may be concerned with efficiency rather than equity, as per the approach taken in economic analyses of the law (see, for instance, Posner, 1992).

The key to either anti-monopoly approach lies in the fact that the laws are concentrated around the key productive resources only - agricultural land (and the houses that service them) and workers (slaves). The reason houses in walled cities are not included is because these are not used for agricultural production, and therefore the houses themselves and the activities carried out within these houses are of less concern in the predominantly agrarian society. Similarly, other durable goods are of no concern since the major factors of production were, at that time, land and labor.

Sanctified lands, on the other hand, are taken out of private hands and given over to the "government." While, from an economic standpoint, private ownership is to be preferred to public ownership, there is little concern that the government will try to "abuse" a monopolistic position. Thus, such lands may remain in government ownership even after the Jubilee.

III. Productivity-monopoly tradeoff

In what follows we consider the second anti-monopoly alternative given above, i.e., that the rich purchasers are able to realize efficiencies not available to the poor sellers. Consider, then, a predominantly agrarian society. Land is initially divided evenly among all members of society, although accumulated total wealth may differ across individuals. In each period there is the possibility of saving costs by making an investment in the land (or in the farming process), however, the cost of the investment must be borne during the planting season, and its fruits are reaped only

[13] Note that the lack of capital markets extends also to a lack of insurance markets.

after harvest. In the presence of perfect capital markets all landowners would make such investments. However, capital markets are not perfect, and only those with sufficient wealth to bear the up-front cost make such investments. Those incapable of raising the capital necessary to invest in their land still plant and harvest, but profit less.

The yield attained in any given year is a random variable, and each year some proportion of the population finds itself in dire straits, and is forced to sell its land. Since the value of the land is greater to one who can afford to invest in the land than to one who cannot, those with greater accumulated wealth will purchase such lands. Efficiency will be enhanced, since cost-saving investments are being made under the ownership of the rich, while they were not made when the poor owned the land. However, over time, as more poor landowners are forced to sell their holdings, land-ownership becomes increasingly concentrated in the hands of the few, and may lead to excessive market power and to increased prices and restricted production. If this occurs, there exists a tradeoff between greater efficiency in production and a decrease in production resulting from monopoly power.

With modern-day legislative abilities, the accumulation of market power (either with or without the investment consideration) might be handled by creating a commission that would be in charge of monitoring producer behavior. This commission could limit the amount of land owned by a single individual, prohibit cooperation between horizontally competitive firms, or regulate the price at which such goods could be sold. However, such methods were not available, and may not have been feasible given the state of information gathering and record keeping in existence. Still, a general, highly simplified, and highly visible decree could be upheld. Thus, for instance, a law stating that it is illegal to sell land might be enforceable, but it would be inefficient, and might lead to widespread starvation. We believe that a decree that lands be returned to their previous owners is also such a simple, tractable rule. When investment activity is important, it may also be a second-best way to balance between the desire for efficiency and the fear of accumulated market power.[14] The main idea is to allow the accumulation of lands while the market

[14] In some ways, a decree requiring the return of land is simpler to uphold than forbidding the sale of land, since with the sale of land both the buyer and seller have an interest in having the transaction completed, and so are unlikely to report transgressions, while with the return of land in the Jubilee, the interests of the buyer and seller are diametrically opposed once the Jubilee arrives, so transgressions are sure to be revealed.

remains relatively unconcentrated, but to return the lands to their original owners (a corporate breakup) before concentration becomes too high and social welfare is harmed. This return of the land has the result of decreasing concentration, but also of decreasing welfare-enhancing investments.

There are two ways the limiting of concentration can be carried out. It can be decided and enacted upon at any point in time, as in the clean slate proclamations discussed above. Thus, when the ruler sees that things have gotten out of hand, he declares a clean slate in order to lessen concentration of economic power. The upside from such a system is that it allows maximum flexibility, so that in particularly difficult periods clean slates can be proclaimed more frequently, while in good times they can be more infrequent. The downside from this system is that it creates uncertainty, and requires significant political power since it is likely to come under attack by the wealthy landowners, who are harmed by this edict. The uncertainty, in particular, may be crippling, since potential buyers may fear the oncoming of a clean slate proclamation, and will then be less prepared to purchase land from the destitute. Since the supply of the destitute is likely to be relatively inelastic, this will have the probable effect of driving transaction prices down, to the detriment of the poor. The alternative, as per the Jubilee, is to predetermine the time at which the clean slate will be granted, losing flexibility, but gaining certitude. Note that since the date of the return of the land is known from the start, purchasers are not harmed, since this is taken into account in the purchase price of the land (Raskovich, 1999). This is explicitly taken into consideration in the Bible, which states that:

> "When you make a sale to your fellow or make a purchase from the hand of your fellow, do not aggrieve one another. According to the number of years after the Jubilee year shall you buy from your fellow, according to the number of crop years shall he sell to you. According to the greater number of years shall you increase its price and according to the lesser number of years shall you decrease its price for he is selling you the number of crops." (Leviticus, 25, 14-16).

And with respect to buying back the land once sold:

> "Then he shall reckon the years of his sale and return the remainder to the man to whom he had sold it and he shall return to his ancestral heritage." (Leviticus, 25, 27).

IV. The Model

We demonstrate the tradeoff discussed in the last section with a simple but illustrative model. Consider an economy with *n* identical parcels of land, each owned by a different individual. There are two types of landowners. Most landowners are poor, and use the land they own to subsist. There are a few, however, who are relatively rich, and have sufficient capital to engage in additional economic activities. Each landowner produces goods, which can be sold in a competitive market (or consumed, with any excess supply sold on the market). Total demand for the product is given by $Q_d = Q_d(P)$. The cost of producing the product is identical for all individual landowners, $C = C(q_i)$, with $C' > 0$, and $C'' > 0$, the last because of diminishing returns. However, an investment can be made at the start of the planting season that will lower total costs (including the cost of the investment) by hq_i. We assume for simplicity that this investment cannot be made by the poor landowners because of a liquidity constraint and an imperfect capital market. Rich landowners, however, have sufficient capital to make these investments.

The amount produced by a competitive landowner is found by setting marginal cost equal to the expected price, and it is assumed to be stochastic due to outside influences (weather, diseases, etc.). Thus, we write $q_i = q_i(P) + \varepsilon$, $\varepsilon \sim (0, \sigma^2)$. For simplicity, we assume that shocks are i.i.d. across landowners each period.[15] Define a subsistence level of consumption by $\underline{q}$. In each period all landowners realize a certain level of production, with any poor landowner receiving $q_i < \underline{q}$ being forced to sell his land in order to survive**.** In each period, then, an expected proportion $\phi = \Pr(q_i < \underline{q})$ of the lands owned by the poor are sold, so that *t* years after the clean slate, a proportion $(1-\phi)^t$ of lands are still held by poor individuals. The expected supply of goods by these private landowners in time *t* is then given by $Q_f = (1-\phi)^t nq_i(P)$.

We assume that the lands sold are all purchased by a relatively small group of wealthy individuals.[16] We also assume that members of this group are sufficiently few and well organized to be able to costlessly enforce a cartel agreement (particularly

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[15] This assumption is not necessary. Shocks could be correlated during any period across families due to, for instance, weather conditions. In this case, there will be years in which the "rich" buy more land and years in which they buy less. Accumulation of landownership over time would then depend on the shocks, so that the calculations we make would only be correct for the average experience. However, since the Jubilee is a repetitive process, and weather conditions cannot be expected to repeat themselves exactly once every fifty years, using this average is appropriate. For other clean slates, proclamation will occur more often during economic downswings.

since there are no laws forbidding such unions). Under these conditions, this group will act like a cartel with a competitive fringe, i.e., the rich landowners cooperate to behave like a price leader, that takes the presence of outside competitive firms into consideration when setting their policy.[17] The residual demand facing this group is:

$$Q_r = Q_d - Q_f = Q_d(P) - (1-\phi)^t nq_i(P) \tag{1}$$

Since marginal cost is increasing (and there are no fixed costs involved in using a field), the cartel will always produce identical quantities in each field. In addition, it will always make cost-reducing investments. Hence, inverting (1), the objective function of the cartel is:

$$\underset{Q_m}{Max}\,\pi = \left\{P(Q_m)Q_m - \left(1-(1-\phi)^t\right)nC\left(\frac{Q_m}{\left(1-(1-\phi)^t\right)n}\right) + hQ_m\right\}, \tag{2}$$

where Q_m replaces Q_r in (1). This optimization yields an optimal production level for the cartel:

$$Q_m^* = Q_m^*(\phi, t, n, h, C(q_i), Q_d(P)). \tag{3}$$

While this term cannot be solved for explicitly at this level of generality, comparative statics are possible using the implicit function theorem. Thus, for example,

$$\frac{\partial Q_m^*}{\partial \phi} = \frac{-\partial^2\pi/\partial Q_m \partial\phi}{\partial^2\pi/\partial {Q_m}^2}. \tag{4}$$

Since the denominator is negative (second order condition):

$$sign\left(\frac{\partial Q_m^*}{\partial\phi}\right) = sign\left(\frac{\partial^2\pi}{\partial Q_m\partial\phi}\right) = \frac{C''Q_m t(1-\phi)^{t-1}}{\left(1-(1-\phi)^t\right)^2} > 0. \tag{5}$$

Similarly, it is straightforward to show that the amount produced by the cartel will increase if *t*, *n* or *h* increases. Changes in the demand curve and cost curve would have to be further specified in order to determine their signs.

Replacing (3) in (1) will yield the price:

$$P^* = P^*(\phi, t, n, h, C(q_i), Q_d(P)). \tag{6}$$

The comparative statics of the price cannot all be determined, but an increase in *h* (the cost savings from the investment) will lead to a decrease in the price. Replacing (6) in

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[16]The price paid for the land is not an issue here, but will be between the value placed on the land by the seller, and the value of the land to the buyer. In the case under consideration, the buyer is likely to have far more bargaining power than the seller is.

[17] See e.g., Carlton and Perloff, 2000.

Q_f and adding it to Q_m^*, we get the total quantity produced:

$$Q^* = Q^*(\phi, t, n, h, C(q_i), Q_d(P)). \tag{7}$$

Once again, most comparative statics are indeterminate, but an increase in *h* will lead to an increase in total production.

In what follows, we assume that the crux of the proclamation is to maximize societal welfare. Consumer surplus will equal:

$$CS = \int_{P^*}^{\infty} Q_d(P)dP \tag{8}$$

Usually this would strictly decrease with increases in the size of the cartel. But, as demonstrated in Carlton and Perloff (2000, Chapter 5) the decrease would not be linear. Rather, the damage is at first small, but it increases at an increasing rate as the cartel gains control over more resources. In our case consumer surplus will actually rise initially with increases in cartel size because of the increase in cost saving investments. Once consumer surplus begins to decrease it will exhibit the usual pattern just described. This will be demonstrated in the example in the next Section. Producer surplus will equal:

$$PS = P^*Q^* - (1-\phi)^t nC(q_i(P^*)) - (1-(1-\phi)^t)nC\left(\frac{Q_m^*}{(1-(1-\phi)^t)n}\right) + hQ_m^*. \tag{9}$$

The first term in (9) is the income, the second the cost of the fringe firms, the third the cost of the cartel firms, and the last term is cost savings from the investment. Note that the savings from the investment are realized even when the cartel is very small $(\partial PS/\partial Q_m = h)$, but the derivative of the other three terms with respect to Q_m approaches zero as *t* approaches zero. Thus, we are guaranteed that for sufficiently small values of *t* welfare will be enhanced by increased concentration.

The total effect will thus be to initially increase welfare as more lands are being purchased. Welfare will continue to increase, but may at some point fall. This will occur if, as a result of increased prices, the gain from cost savings becomes outweighed by the fall in consumer surplus. This relationship is demonstrated in Figure 1.

In this figure, as in the model, time is a proxy for the portion of the assets held by the cartel. Welfare increases until period t_1, and then decreases. The first-best solution would be to limit the concentration of land ownership to the level that exists initially (resulting in competitive pricing (no cartel)), and at the same time, to have investments made by all landowners. However, the first-best solution is not attainable.

The alternative that suggests itself from Figure 1 is to have the clean slate coincide with period t_1. This, however is not the optimal, because once a clean slate is declared, welfare returns to the competitive level, W_c, and, as seen in the figure, if a clean slate is not decreed, welfare remains above W_c until period t_2. Thus, we suggest, the declaration of the clean slate should coincide with period t_2. The difference between a clean slate and the Jubilee is that in the former a clean slate will be proclaimed if and when t_2 is reached, and so can be based on economic developments, while in the latter it is predetermined, and thus must be based on expectations.

V. An Example

To illustrate the model, we present the following example, which considers a Jubilee type (fixed timing) declaration. The example could as easily be thought of as an example of the *expected* optimal timing of a clean slate proclamation. The example has been "fixed" to yield the "right" result (a Jubilee once every fifty years). It is not our contention to posit that fifty is the optimal number of years between proclamations. Rather, our point is to demonstrate that the Jubilee can help balance between decreased competition on the one hand, and the ability to make optimal investments on the other hand, and as such allows the economy to approach the optimal solution.

Assume a demand curve $Q_d = 1000 - 10P$, a cost function $C = 20q_i + 10q_i^2$, and 1000 parcels of land. In addition, assume the investment lowers marginal cost by 1.85 per unit, and that two percent of the (remaining) private landowners must sell their land each year.

Under these conditions, production levels and price will be set as follows:

$$Q_M = \frac{\left(16370 + 1.85 \cdot 0.98^t\right)\left(1000 - 0.98^t\right)}{44000 - 20 \cdot 0.98^t}, \tag{8}$$

$$P = \frac{20000 - 20Q_M + 20 \cdot 0.98^t}{200 + 0.98^t}, \text{ and} \tag{9}$$

$$Q_f = \frac{0.98^t\left(P - 20\right)}{20} \tag{10}$$

Table 1 demonstrates the resulting situation. The first row shows the outcome if the first-best were attained – i.e., if investments could be made by all landowners, so that no lands were sold. However, since this result is not attainable, we show how the key variables change over time under a Jubilee regime.

This table shows how the economy progresses as the Jubilee year approaches. The critical variable from our perspective appears in the last column - total welfare. Note that total welfare is maximized in year 23, during which time 37.2 percent of the land is owned by the cartel (which accounts for 31.6 percent of production). However, even after this date welfare remains above that in year zero, which is what is attained when lands are returned to their initial owners in the Jubilee year. Thus, it is not optimal to declare the Jubilee at this point; rather the return of lands should be done when welfare falls below the level with competition. This occurs, in our simplified example, in year 50.

Note also in the table that, as discussed above, consumer surplus initially rises with increased purchases by the cartel, and, concurrently, prices fall. This occurs because the negative effects of a cartel approach zero when the size of the cartel approaches zero, and then increase more than proportionally with cartel size. The benefit from the investment, however, is obtained immediately. Consumer surplus, in our example, is maximized 4 years after maximum diffusion of lands is attained following the Jubilee proclamation.

VI. Summary

In this paper we suggest a new view that treats clean slate proclamations, such as the Biblical Jubilee, as anti-monopoly laws. This treatment is supported by the fact that the edicts revolved around the predominant factors of production alone, and were unconcerned with other issues of equity and inequality. Thus, for instance, one of the edicts is that land for cultivation must be returned to its original owner, while land for consumption purposes are not returned.

While clean slates and the Jubilee share most characteristics, one major difference exists - while clean slate laws were decreed by rulers and at the discretion of these rulers, the Jubilee set a fixed time period between proclamations (50 years). Given that the Jubilee was enacted after the inception of clean slates, we view this choice as the determination of a fundamental tradeoff between fixed and variable intervals between proclamations. In particular, while a variable interval allows flexibility, it leads to uncertainty on the part of sellers and buyers. In our view, a fixed period between clean slates was chosen for the Jubilee because the uncertainty in previous clean slates resulted in too much inefficiency.

Two alternatives to the anti-monopoly approach can be taken. The first alternative is to say that the 50-year decree of the Jubilee is simply a Biblical estimation of how much time should be allowed to pass before action is taken. The second alternative stems from the observation that it is the rich who are, in general, acquiring the land, and that it is therefore quite plausible that the purchasers are able to put the land to better use than the sellers, simply because they have the resources to work the land and invest in the land in a more efficient manner. In the model we develop this second alternative, and demonstrate that the requirement to return purchased land to its original owner can be a second-best solution to excessive market concentration in the presence of imperfect capital markets. There are two opposing forces in effect. Efficiency requires allowing goods to be freely transferred to the people that value them most. In a situation in which attaining these cost savings requires an investment, poor land-owners may be incapable of raising the capital necessary to invest in their land because of imperfections in the capital markets. In this instance, these lands will be more valuable to society if they are owned by the rich, since sale of the land to the rich allows investments to be made and cost savings to be realized. On the other hand, accumulation of lands in the hands of the few allows unreasonable market power in an economy based predominantly on agriculture. Clean slate proclamations, then, play the role of modern day antitrust law – allowing for welfare enhancing investments to be made, but limiting monopoly power.

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Figure 1

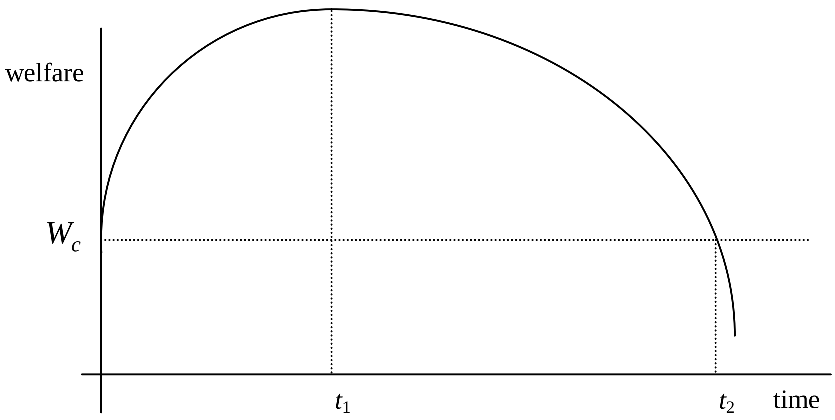

Table 1

Year	Non-Cartel Firms	Price	Cartel Production	Non-Cartel Production	Total Quantity	Consumer Surplus	Producer Surplus	Welfare
First-best	1000	31.79	–	682	682	23262	4652	27914
0	1000	33.33	–	667	667	22222	4444	26666
1	980	33.31	15	652	667	22240	4453	26693
3	941	33.28	42	625	667	22258	4485	26743
4	922	33.27	55	612	667	22260	4508	26767
5	904	33.28	67	600	667	22256	4533	26789
10	817	33.41	118	548	666	22174	4711	26885
20	668	34.04	191	469	660	21755	5225	26981
22	641	34.22	202	456	658	21636	5349	26985.6
23	628	34.31	207	449	656	21574	5412	26986.3
24	616	34.41	212	444	656	21513	5473	26986.0
30	545	35.06	239	410	649	21084	5878	26962
40	446	36.36	272	365	637	20250	6599	26848
49	372	37.73	293	330	623	19390	7292	26681
50	364	37.9	295	326	621	19282	7376	26658