A contribution to the analysis of the in-game economy of larp events

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Sumary:
The in-game economy on large larps in Denmark has been seen very little attention from the organisers, despite being of great importance to the players and representing large expenses on the organiser's budget. This article attempts an analysis of in-game economy, using common economical models, and suggests methods for dealing with some of the malady. My findings is that careful taxation, food-vendors paying in-game money for raw materials and regulate the flow of money by introducing guilds best counter the rabid inflation seen on larps. Fixed prices may be counter-productive. However, the real problem lies in the fact that few organisers ever treat economy as more than a scenographic element.

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Introduction

This analysis is based on experiences from the Danish larp-scene. This scene predominately produces fairly large fantasy or quasi historical medieval larps lasting several days, usually over a week end. Commonly, the game areas are enhanced for gaming purpose with various props, auditory equipment, pyrotechnical effects and external resources, either actual or symbolical. Peculiar to Danish larp, the participation fee normally cover all sustenance needed, to be bought with in-game money by the players. This food often constitutes the largest singular expense on the organiser's budget.

The analysis is based on experiences from several years of larp group Einherjene, Denmark, though the principles should be applicable to other groups and games. This article is primarily based on the authors own experience with Danish larps (Nemefrego 6 2001; Dalens Døtre , 2002; Anno Domini 2003; Heltedåd og Brudefærd 2004; Einherjerne) as well as valuable input from other sources (Sandberg, *pers kom* og Bøckman *pers kom*.)

Material and definitions

This analysis is limited to dealing with larger larps. A large game is defined by three criteria:

- The first criterion is that the game in question is large enough that a certain amount of scenery becomes feasible. Such scenery also commonly contains some symbolical value markers in the form of in-game money. The analysis is of course irrelevant in moneyless games, though some of the principles still may apply.

- Secondly, the game needs to be of a certain length. Though the exact time might be debatable, I suggest the game must last for more than 24 hours.

- Thirdly, there needs to be enough participants so that no role knows every other role's motives, actions and needs.

Only if all three criteria are fulfilled, the game is defines as a "large game" for the purpose of this article. For a large game to have an actual economical system, the game needs to have a monetary feedback system, that is, that is there is some sort of built in diegetic mechanism returning money to the primary spenders. For smaller games, the rules may still apply, but these being more transparent; the analysis will become self evident or irrelevant.

Primarily due to the Danish way of organising larps, where the participation fee covers all sustenance needed, we will assume that during the course of the game, the focus will be on basic needs. The needs of the players can be seen as a Maslowian Pyramid of Needs, where the subject will seek to fulfil the need for food and shelter first, then the social and identity needs and lastly self realisation (Alderfer, 1972). If the players have been hungry, thirsty or have slept in a wet sleeping bag - rampant critique will soon surface. The failure to fulfil the basic needs properly is what most often leads to critique of the organisers in Danish larps.

An analysis of the in-game economy of large larps is interesting because this will help the organisers alleviate any problems that may arise due to failure in supply of sustenance. A well working in-game economy is here defined as one that will lead to minimal inflation, thus giving

players an even access to food and drink as long as the game lasts (barring day-night fluctuation in availability).

Inflation and money stock problems

The common problem in achieving this is that most participants receive a fixed amount of money at game start. This distribution, being essential to the working of the economy, is peculiar to the Danish scene. This money is amply enough to sustain him the first day. However, as inflation goes rampant, daily income (either from a paid in-game job, or owning a store or boutique) will effectively diminish. Though real hunger and thirst is relatively rare (most people can function perfectly on very little food for a few days), the loss of economic power, or the absence of increased wealth with increased income will lead to dissatisfaction. This too will lead to criticism.

In most large fantasy games, there is no possibility for trading with external economies, exchange money, investments or do anything else with one's wealth other than consume. Therefore, large larp economies may be seen as a closed economy with an exceedingly small public sector (the local ruler) and similarly small financial sector (the nobility or rich merchants). This is usually an unconscious choice made by the organisers.

The analysis of large game economy is based on the Theory of Quantity (Dornbush, Fischer & Startz 2004)

Table 2: Theory of Quantity,

V * M	=	P * Y

The Theory of Quantity quantifies the relationship between the stock of money (M), the velocity money (V), the price level (P) and the "output" and the available amount of merchandise (Y):

- **V** is the rate at which money is recycled in the economy. By convention this factor is denoted V for velocity. The velocity of money is a measure of how many times the stock of money (M) is used for purchase by the consumer within time, *t*.

- **M** is the games stock of money, the total amount of money (coins, notes or other monetary unit) available in the economy.

- **P** is the level of prices of the general merchandise, that is, the mean price for all in-game merchandise, services, etc. available to the players on the market (i.e. the larp). The mean price times the amount of merchandise equals to total amount of money spent during time, *t*, which would be the length of a given larp

- **Y** is in this model the amount of merchandise (food, services) available to the general public. This can be seen as the larps Gross Domestic Product.

In this analysis, we consider the stock of money constant. For all practical purpose, the players can't fabricate new coins, and there are no-one outside the game that can feed more coins into the system. The organisers will usually control the influx of sustenance or merchandise constant, and keep it

fairly constant. The players cannot during time *t*, sow, grow and harvest crops, nor can they commence slaughtering of animals. For the sake of simplicity assume that the amount of merchandise is constant throughout the game, though Y will in reality decrease as the players eat and drink during the game.

Table 3: Basis for the analysis

V * *k*M	=	P * *k*Y

The basis of the analysis is a variable velocity of money, and a fluctuating price level, combined with a constant money stock and merchandise. The results for the economy for a large game are evident.

Basic economic in-game structure

The amount of money is unequally distributed among the various groups of players. The poorer roles, the "*riff-raff*" have the least money, while the "middle class" (tradesmen, innkeepers, soldiers etc) will have considerably more. At game start, the upper class (the nobility) will usually have extraordinary reserves of money.

Those with an interest in economy may argue that the treasuries of the noble class is separate from the market, and that upper class consumption may be seen as an increase of M, rather than V. This argument does not change the fundamental analysis or the results, though it may have a bearing on the results of the suggested tools.

During the first hours or day of play, a transfer of money from the upper to the middle class takes place. The middle class again transfer parts of this money down to the lower class. At the same time, there is a corresponding transfer of goods and services from the two lower classes to the upper.

The economical problems occur when nobility's monetary reserves, previously confined to the treasury chest, are put into circulation. When this money enters the economical system, the paid workers can suddenly spend their income and their monetary reserves. Thus, the velocity of money increases, as the baker can spend the money earned on bread, on beer right away. Even though the stock of money is constant, the velocity of money speeds up as soon as the upper classes start spending their money.

It might be argued that the spending of treasuries constitutes an increase in the stock of money, thus tipping the balance towards inflation as the amount of goods and services remain constant.

However, the nature of large games makes this effect worse. In a real life situation, sudden extra income would at least partly be taken out of circulation to form monetary reserves (investments, savings etc.) by the lower classes, i.e. effectively making it a transfer of monetary reserves from the higher to the lower classes. While we might expect this money to return to circulation in the long run, (dissaving, return on investments, etc.) such hoarding of money would at least even out the velocity of money, reducing inflation. However, in a larp, when this money enters the economical system, the paid workers can (and will, since saving and investments is not attractive, and not even possible), suddenly spend their income, and, not expecting to experience any dire needs in the foreseeable future, their potential savings. We will return to the psychology of spending later.

Increased velocity of money is influenced by another peculiarity of larp: The small area. Particularly in a densely populated country like Denmark, game areas are by necessity small. This reduces the physical distance any coin need to travel in order to be spent. It is fully possible for a coin to be payment for food, payment for beer, taxation and be redistributed as soldier's wages all within a 200 meter diameter from the original transaction. With such small distances, the time needed for such transactions can be breathtakingly small. The above mentioned chain of transactions could well take place within a quarter of an hour. Thus there is neither in-game nor off-game natural obstruction for an increase in the velocity of money (or increase in money stock).

The quantitative theory tells us what's bound to happen when V (or, as can be argued, M) increases.

Table 4 : Increased turnover rate in the analysis

V' * *k*M	=	P' * *k*Y

Note: The V' denotes the change in V, not V itself. Likewise, P' denotes the change in P.

An increase in V and a constant amount of money will by necessity lead to rising prices when the amount of merchandise is constant. As an example, we may consider luxury goods. The middle classes are initially given 15 coins, placing steak and wine (priced to 30 coins) out of their economic reach. However, as the middle classes are paid in coins by the nobility, the segment of players able to buy steak and wine increases. The amount of available goods being constant, the increase in buyers will push the prices of luxury goods upwards. This is a demand-driven inflation.

So far, the model has assumed that the amount of money (M) is constant, but this is not always so. A factor contributing to the inflation of larps is the sudden injection of previously hidden money, typically in the form of recovered treasure. In principle, an increase in the stock of money could be accommodated by a drop in the velocity of money, so that V falls accordingly to the increase in M, thus retaining P&Y at a constant level. But, as discussed earlier, this will not happened, as the newly discovered treasury is not saved or invested, but spent right away. This happens so quickly, that V does not have time to drop.

In summary, we have seen that both an increase in the stock of money (through uncovering of hidden treasures) and an increase in the velocity of money (through upper class consumption), leads to a rise in prices and thereby to inflation.

Psychology of players and its influence on in-game economy

Savings, or the lack thereof.

Factors outside of the diegetic frame of the game will influence the players' actions in the mini-economy of large games. A real life economical actor will have some sort of real or expected monetary reserve, whereof one part will be saved or invested, and another part will be spent. However, the players know that once the game is over, they will again have access to normal market resources (including food and drink). Laying down monetary reserves or investing money

into projects that may later yield profit, will therefore not be a factor that promotes the players into saving money.

Game over

Another factor is the "game over"-factor common among large game participants. The influence of the game over mentality on game-play and plot structures is beyond the scope of this article, but some factors need to be considered. As the players are all aware that the game ends at a certain time, actions become bolder, as the risk of spending a large part of the game as riff-raff (or even dead) diminishes as game-end approaches. Effectively, the role with all its ambitions and fears ends as the game ends. Another result of this is big battles that commonly rounds off large fantasy larps, as the role has nothing to loose by being killed.

From an economical point of view, the game over mentality means that the quota the player saves will diminish with time. As the larp is over, in-game money will under most circumstances loose all value anyway, thus spending is actively promoted!

Inflation and saving

The inflation in itself will also act as a detriment to saving. If we assume an inflation of 20% per day, the quota of money saved will loose a fifth of its value overnight. The money spent, on the other hand, can not loose value. The same factor governs real-life macro economy. If interests where not a factor, saving money would only be a rational choice if there was deflation, while during inflation, taking up a loan would be the only sensible choice. With the runaway inflation commonly seen in large games, the only reason to save money would be to enjoy the look of numerous in-game coins.

In the previous section we saw that inflation is either due to an increase in the velocity of money (V) or an increase in the money stock (M).

If even a small part of the middle classes' income from the upper class or recovered treasures was spent on investment and savings, the inflation would drop drastically. A 20% marginal propensity to save would translate into around 20% lowering of the veolocity of money – thus lowering the increase in prices. An increase in the stock of money could lead to an increase in savings and halting the velocity of money (V), balancing the rates of V and M. Unfortunetly we have already concluded that the marginal propensity to save equals almost zero, intially being dependant of style of play and experience in larps, moving towards zero as the game progresses.

In summary, we have seen that an increase in the velocity of money could result in a fall of the stock of money (for instance via saving), but this is countered by players' action in the in-game economy. The result is that V and M does not balance each other, and we get a runaway effect on P.

Tools for countering the problems

The problem

It should by now be evident that a large part of the problems around participants' access to food, drink and luxury goods is caused by a lack of balance in the economical system. As there is neither

a central bank, nor interest rates to regulate the stock of money or further incitements to monetary investments, we are cut off from conventional economic tools of bonds and interest rates. A central bank as an incitement will only work in the long run, and the “game over”-mentality of players makes them spend all their money towards the game end. Thus, an investment in anything but in-game goods (bread, beer etc.) will never be an attractive alternative.

Throughout the years various organisers of large games have tried different approaches to solve the problems of in-game economy. Here, some of these approaches are analysed using the Theory of Quantity.

Table 5 : The Theory of Quantity

V * M	=	P * Y

The basic problem is an increase in V or M. We will now look at some attempts to counter this:

Countering increase of V

As the consumption by the upper classes increase, more money enters the economical system, resulting in an increase in V. This money is almost exclusively used for buying goods from the in-game vendors. We may assume these vendors to have a marginal propensity to save of 5%. The velocity of money of the sum of money paid is increased with 95%. This money will again be used for the restocking of the store and the vendors' personal expenses and consumption. If we introduced a tax system so well balanced that it could take out of the store exactly the amount of money remaing after restocking and expenses, the velocity would remain at a constant. This, on the other hand, demands that taxes must be regulated and collected after each transaction, thus keeping the vendor from spending the extra money on consumption.

The problem with this approach is evident. The tax collector has little chance of keeping track of how much each vendor will need after taxation to replenish stocks, or the nominal value of the savings. Also, the number of customers may vary, thus hard taxation risks bankrupting the vendors responsible for food distribution! A balanced taxation will require having the tax-collector always present at each vendor. Also, the tax-collector will have no way of knowing how much a not stationary vendor, like a shoemaker serving multiple customers have earned, or the whereabouts of the shoemaker for that matter!

One way to keep some control of the money is to establishing other in-game monetary relations and dependencies (properties, trade rights etc.). These are really just other means of organising a tax system however, all with their merits and drawbacks. In-game guilds may fix prices, *k*P, in a way that does not feel unnatural to the players. At the same time, players may have as part of their personal plot to put aside money for their guild. This will increase savings, reducing the stock of money, without removing them from the game all together, thus reduce the velocity of money. Even the use of all these tools will probably not be able to make up for the effect of V and M on P and Y. A fixed P will sooner or later lead to a rising demand for Y.

However, the increase in V can be dampened by the vendors must pay for the raw material. This will draw money out of the game (M will diminish). The aim is making the decrease in the amount of money in circulation balance prices so that they remain constant. For this, the prices of the raw

material need to balance the increase in money circulation speed (V), taking away the vendors ability to make a profit. However, an action like this requires a decrease in M, exactly equal to an increase in V – and there is no way any organiser could perform this calculation, since we can not foretell the different players' urge to save.

A tax collector, and payment for raw material may effectively counter the variations in V and thereby P. However, payment for raw materials means less income, and thus less tax for the upper class. In the long run, this may lead to a collapse in the economy. With diminishing stock of money in-game, the balance of the equation may shift with deflation as a result.

Countering increase of M

An increase in the stock of money in a large game economy typically happens as organisers refund economically important roles that have run out of money, or by the finding of treasure. Whether the increase in M is due to lucky players or nobility in an economic pinch, an increase in M will mean an increase in consumption. As mentioned earlier a marginal propensity to save will take the edge off the problem, but as we have seen, this is not realistically achievable in most larps.

Once again we see that vendors having to pay for raw materials may counter the effect of an increase in V relative to P. Again, this will lower available amount of money (M), and lower the income of the upper class. Some of the money should therefore be returned to the upper class as "land income" (historically, the main basis for the nobility's income in the feudal system). Thus, the organisers may regulate M to counter an increased V, but only within the bonds of the nobility's need for income. In short, paying for raw materials may become a very finely tuned, consumption based taxation.

It should be noted that payment for raw material is a double edged sword. Combined with a zealous tax collector, the result of payment for raw material could mean the bankruptcy of the vendor. On the other hand, an inept tax-collector will result in a very wealthy merchant with a large income and equally large consumption – thus the goal of reducing V is not achieved since the vendors consumption will increase equal to the turnover in his store minus the payment of raw materials.

If there where no tax-collectors, all the money would eventually end up with the vendors (or leak out of the system as payment for raw material). This would quickly dethrone the nobility, making the vendors the new effective diegetic rulers. Making vendors pay for raw materials, is a way of bleeding the system of money, and lowering the vendors profit. A theoretical solution would be for the organisers on a non-diegetic role to ensure that vendors don't end up with more profit than their staring capital. This approach would ensure a fairly stable velocity of money, and allow the three classes to continue their initial consumption. However, mixing in non-diegetic economical means is not desirable in the traditional large game setting in Denmark, and it would take away the vendor players' incitement for doing trade. We might also expect a certain form of "cheating", as the vendors too get the money to buy sustenance from their business. A mix of diegetic and non-diegetic dealings with the tax-collector may potentially get very ugly.

Tying game economy to real life economy

A way to address the problem of inflation is to tie the in-game monetary system to the real life economic system, and set an exchange rate for the in-game money tied to your countries currency.

This is the same strategy used by small countries to combat extreme inflation, who usually tie their currencies to US Dollar. While this solves the problem of inflation immediately, it does make some larp aspects very problematic. In-game theft will become real life theft; extremely rich roles will have to spent extraordinary amounts of real money; etc. A mixed tied and untied economy may be a somewhat less troublesome solution. In this system, one essentially has a double currency system, where one unit of money is real, the other not. One may for instance let low value "brass coins" be Danish 10 krone coins, while the high value silver coins (that features in all major transactions) are game money. This system has been used in a few games like the Norwegian Cowboy larp Wanted with success (Bøckman, *pers kom.*), though it too limits the in-game economical possibilities in the game.

Let us leave the velocity and the stock of money, and instead have a look at the possibility to influence the other half of the equation, the level of prices and the amount of merchandise.

Fixed prices

The organisers may fix prices as part of the rule system, just as they may fix combat stats or rules for magic. This non-diegetic setting of prices may ruin the vendor-players' game. However, there are diegetic means of assuring the same effect, through guilds and guild-fixed prices in a fantasy or medieval larp.

The central point of non-diegeticly fixed prices is that the organisers attempt to fix a constant P. This will immediately solve the problems with V & M's effect P. However, this solution will open another can of worms. If V & M can not be balanced by a variation in P, it will make up for it by altering the amount of merchandise, Y. If the middle class increases their available capital (which we have seen will happen quite quickly) and the prices remain constant, they will demand an amount of goods that simply is not there. Remembering the example of steak and wine – the middle class will begin to demand the quite exquisite goods, intended to be available only to the nobility, and thus only bought in small stock by the organisers.

Fixed prices will diminish the vendors' gains, giving them less impetus to make and distribute goods. This may at its worst end up with empty shelves and long queues, similar to conditions in countries with defunct, central planned economy. The fixed price system was attempted on Trenne Byar, with the predictable result that food distribution became ineffective, and the players went hungry despite raw food material being available (Sandberg, *pers kom*).

Increasing amount of merchandise

One solution close at hand is to increase the amount of available goods. On day one, Y equals *n* units of merchandise. The number Y will rise until the last day, so that *n* equals Y multiplied with the effect of V & M. However, calculating V and M is impossible, so balancing inflation of prices with Y is at best guesswork. Pumping a surplus of food and drink into the economy may will in most cases lead to the players eating more or even vast stores of spoiled food not eaten by the players at the end of the game.

While this may solve the in-game problems effectively, the solution is not desirable from an organising point of view. Food is usually the largest expense on the organiser's budget in Danish

larps, and this strategy will make it even larger. Also, the experience of Trenne Byar, where the organisers had calculated a surplus of vegetables of about 100 kg, shows that a surplus of merchandise will not automatically solve the problem.

Conclusion

It should be obvious to the reader that the economy of large games is almost as complex as real life economy. It is this that makes the in-game economical system so interesting. To fully solve the problems of in-game economy will require total control over all actors in the system or unlimited information of all transactions in the game, any attempt at putting forward a "perfect solution" will be futile. Instead, this analysis will give advice on how to best meet the challenges posed by the Theory of Quantity.

P*Y	**=**	**V*M**
V increases		Taxation and payment for raw material.
M increases		Marginal savings organised through guilds
		Through in-game guilds or tying to real-life
P fixed		economy
Y increase with time		By increasing food delivery.

The starting point is the double problem of an increase of both V and M during a large game. To counter the effects on P and Y, I suggest taxation and payment for raw materials. The later will work for pulling money out of the game, lowering M. Taxation will limit the useable income, thus lowering consumption and V.

Lack of merchandise is here considered less damaging to the game than inflation. While short supply won't stop specific group from getting food (except perhaps those who lack the patience to stand in a queue), inflation will only allow the upper classes access to goods and groceries. As the aim of this study is to counter malcontent in the players of large games, inflation is the main enemy, as it leads to actual discomfort and envy.

It has come to my attention that some organisers in Denmark as well as in Scandinavia have considered to organise very large projects – such as the pan-Nordic "Dragonbane". On a more local scale, some Danish larp societies have mentioned the possibility of having different cities with different currencies. Apart from the real problem of running a stable economy including food for around 1000 players, the problem of exchange rates must be considered. Between various currencies, real exchange rates may deviate enormously from the expected or 'natural' exchange rate, creating substantial problems in supply and demand for groceries. One worst case scenario would be one currency being able to purchase almost all the goods in the game, while others would be unable to trade with a profit.

The main problem of economy is that it is treated as a scenographic element, not as an important, working part of the game. A lot of the in-game economical problems could be solved if the economy is given the same attention as plots. Seeing how important economy is, the lack of attention to it is surprising. With the experience from medium sized games, I would recommend

someone with a degree in economics parting company with the organisers of such a large larp. If not, we might risk turning a 1000 persons' game into a 1000 persons' experiment in catastrophic economic management.

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LARPs

Nemefrego 6 2001; Einherjerne, Århus, Denmark

Dalens Døtre (Daughters of the Valley) 2002; Einherjerne, Århus, Denmark

Anno Domini 2003; Lars Kjær, Ask F. Neve; Einherjerne, Århus, Denmark

Heltedåd og Brudefærd (Heroic Deeds and Wedding Processions) 2004; Einherjerne, Århus, Denmark

Wanted 1999, Asbjørn Rydland, Geir Carlstrøm, Anne Isene, Oslo, Norway

Trenne Byar (Three Towns) 1994, Et Glass: Christian Angerbjörn, Alexander Graff, Aigars Grins, Gabriel Sandberg, Christopher Sandberg, Gabriel Walldén, Victoria Henriksson and Martin Ericsson & al. Ludvika., Sweden

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Mathias Lysholm Faaborg is a 20 year old student of social sciences at Aarhus University. He has been a larper with the Danish group Enherjene for the last 6 years, and have organised their annual summer larp for the last two of them. He is currently involved in making the larp "Renkespil og Troldtøj" for this summer. The analysis of in-game economy is his first article on larp, born out of the experiences with organising large larps for hungry Danes for the last two years