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**Inequality, tax avoidance and
redistribution**

by

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Inequality, tax avoidance and redistribution

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Abstract

The present paper seeks to explain the pattern of income redistribution in a world of increased market income inequality. In some countries, larger market income inequality has been met by an increased redistributive effort, thus keeping the distribution of disposable incomes relatively stable. In other countries, larger market inequality has been accompanied by a reduction in transfers, thus leading to growth in disposable income inequality. Focusing on two constraints on tax and redistribution programs, namely dead weight loss and tax avoidance, our analysis demonstrates that the initial level of market income inequality is crucial in explaining how increased inequality affects redistribution.

JEL codes: F21, H2

Keywords: Inequality; Tax evasion; Redistribution

1 Introduction

Income inequality has increased in most OECD countries during the last decades, as documented by for instance Atkinson (2003) and Gottschalk and Smeeding (1997). In some countries, redistribution programs have been relatively successful in reducing the impact of lower wages or unemployment on people's disposable incomes. In other countries, the increase in market income inequality has led to a sharp increase also in disposable income inequality.

Consider, for instance, the United States and Canada. Both countries have experienced significant increases in market income inequality during the

1980s and 1990s. In the United States, this development was accompanied by an increase in the inequality of disposable incomes of a similar magnitude, whereas Canada managed to keep the distribution of disposable incomes stable through active redistribution policies, at least until the mid-1990s.¹ Since then, Canada has also seen a sharp increase in both pre-tax and post-tax income inequality.

In Europe, comparing the United Kingdom and Finland, we find a similar development. In the United Kingdom, there has been a significant increase in both market income inequality and disposable income inequality in the 1980s and 1990s. Like Canada, Finland managed for a while to stabilize the distribution of disposable incomes despite an increase in market income inequality. However, since the mid-1990s, the disposable income inequality has increased also in Finland.²

It is interesting to note that Canada has a lower level of market income inequality than the United States. The same is true for Finland compared to the United Kingdom. Is this a coincidence? The quality of data makes it difficult to give a definite answer to this question. As emphasized by Atkinson (2003), different definitions of income across countries and changes in definitions within countries over time, make an international comparison of income inequality and redistribution across countries over time very difficult. The present paper approaches the question from a theoretical angle, asking: Is there a reason to believe that countries with different levels of pre-tax inequality would respond differently to increases in pre-tax inequality?

The mechanism that we focus on to explain the different responses to increased pre-tax inequality is tax avoidance. Our hypothesis is that the relative cost of tax avoidance for an individual falls as her market income increases. Tax avoidance involves, to quote Cowell (1990: 236) “the transfer of some or all of a person’s funds to some sort of tax haven, which could be an offshore island, or some financial arrangement that circumvents the tax

¹From 1981 to 1994, the market income Gini-coefficient for Canada increased from 0.38 to 0.43. The disposable income Gini coefficient, however, remained stable at 0.29 in this time period. From 1979 to 1994, the market income Gini-coefficient for the United States increased from 0.41 to 0.47. The Gini for disposable income increased from 0.3 to 0.36. (Ruiz-Huerta et al, 1999, Table 5, page 20-21). See also Gottschalk and Smeeding (1997) table 4, page 666, for changes in market and disposable income inequality for a selection of countries in the 1980s.

²For the development in income inequality in the United States, Canada, the United Kingdom and Finland, see Atkinson, 2003, in particular Tables 1, 2, 3, and 6.

law.” Tax avoidance, and the illegal version, tax evasion, are serious problems in most countries. It is naturally difficult to quantify the extent of this behaviour, partly due to its quasi-legal or illegal nature. However, Slemrod and Yitzhaki (2002: 1426) refer to a study by the Internal Revenue Service in the United States, estimating that about 17% of income tax liability is not paid. In countries with weaker institutions, this figure is likely to be even higher.

There are several reasons why tax avoidance can be expected to increase in individual income. As argued by Cowell (1990), there are likely to be some fixed costs involved in tax avoidance. These may include accountants’ fees, transaction costs or travel costs to make sure that residence requirements are fulfilled, etc. An increase in market income reduces the relative importance of these fixed costs. In addition, high income people are more likely to derive a larger share of their income from capital rather than labour. Since it is likely to be easier to avoid taxation on capital income than labor income, the relative cost of evasion may fall with income. Similarly, richer people may have a higher level of human capital, and their skills may be in high demand internationally. This would make it easier to avoid taxation through relocation.

Globalisation is often mentioned as a source of increased market income inequality. One justification for this claim is that globalisation, in the form of increased competition from low-wage countries and technological advances in information and communication technology, raises the demand for skilled workers relative to unskilled workers in developed economies.³ Globalisation also poses a challenge to national taxation and redistribution programs. The increase in factor mobility and improved communication systems make tax bases more mobile and may make tax avoidance less costly, thus limiting the ability of countries to implement ambitious redistribution programs. There is a widespread perception in many developed countries that their welfare states are threatened by globalisation, and that governments have lost much of their freedom of manoeuvre.

Wildasin (2003), discussing the impact of economic integration on redistribution, emphasizes the effect of integration on the mobility of the highly skilled, highly paid workers. By choosing residency, a worker can often choose where to pay taxes. Since the taxation of highly-compensated workers ac-

³Feenstra and Hanson (1999) show that technological change, rather than trade or migration, is the main cause of rising inequality in market incomes in the United States.

counts for a very large fraction of tax revenues, the fiscal implications of such relocation can be very high. The importance of high-income tax payers for the total tax income in developed countries can be illustrated by some numbers from the United States. In 1999, one-fifth of personal income taxes were paid by only 0.16 percent of the taxpayers; the top 2 percent of the taxpayers paid over 40 percent of all personal income taxes. The presence or absence of these high income taxpayers is thus a matter of great importance to the US tax system.

The central result of our model is that redistributive tax rates are highest for intermediate levels of pre-tax inequality. In other words, the level of taxation and redistribution is a hump-shaped function of pre-tax inequality. Hence, the model predicts that for a country like Canada, starting with a relatively low level of pre-tax income inequality, the policy response to increased market income inequality is first to implement more ambitious redistribution programs to reduce the impact of globalisation on disposable incomes. If the process of increased inequality in market incomes continues, however, the policy response will at some point be reversed. The less ambitious redistribution program will then cause disposable income inequalities to rise sharply. For a country like the United States, however, starting with a higher level of market income inequality, the prediction of the model is that an increase in inequality will be associated with a reduction in transfers and hence a sharp increase in disposable income inequality.

Our study is related to theoretical work seeking to explain what is sometimes called the “redistribution puzzle”. This puzzle refers to the observation that countries with a high degree of pre-tax income inequality typically have fairly limited redistribution programs, in many cases less redistribution than in countries with a higher degree of pre-tax equality (Perotti, 1996; Bassett et al., 1999). In Bjorvatn and Cappelen (2003) we offer one explanation to the link between inequality and redistribution, arguing that inequality may create residential segregation, which in turn may affect people’s preferences for redistribution. Moene and Wallerstein (2001) point to a different mechanism, emphasizing the role of tax and transfer programs as a form of publicly financed insurance. If insurance is a normal good, then more inequality may lead to less taxation, as the median voter becomes poorer and therefore demands less publicly financed insurance. In contrast to these articles inspired by the cross-country evidence on inequality and redistribution, the focus of the present paper is on explaining the development of income inequality and redistribution over time.

2 A simple model

Assume that there are only two types of people in a country, rich and poor, their number given by n_r and n_p , respectively. The total number of people is normalized to unity, so that $n_r + n_p = 1$. Let $n_p > 1/2$, so that the poor have a majority vote in elections. The income of the poor is given by y_p , while the income of the rich is $y_r \geq y_p$. Let the average income in the country be fixed and given by:

$$y = n_r y_r + n_p y_p. \quad (1)$$

The redistribution program is determined by majority vote and consists of a linear income tax, $t \in (0, 1)$, and a uniform transfer, θ . A deadweight loss drives a wedge between what is collected in taxes and what is left for redistribution. We make the standard assumption that the dead weight loss is an increasing function of the tax rate. More specifically, we assume that the deadweight loss is a fraction, bt , of the total tax revenue, where $b > 0$ is a parameter that captures the importance of the dead weight loss in taxation.

A second constraint on the tax and transfer system is the possibility of tax avoidance. In our model, tax avoidance is only possible for rich people, for two reasons. First, the income of poor people is primarily in the form of wage income, which is reported to the tax authorities by the employer. Second, there may be fixed costs involved in tax avoidance making this kind of behaviour unprofitable for low-income earners. The rich people, on the other hand, may find it profitable to shelter some or all of their income from taxation. Let \hat{y}_r denote the income of a rich person that is actually reported to the tax authorities, so that the amount of evasion equals $y_r - \hat{y}_r$.

The transfer that each person receives can then be expressed as

$$\theta = t [y - (y_r - \hat{y}_r) n_r] (1 - bt). \quad (2)$$

The median voter is poor, and her contribution to the redistribution program is given by ty_p . Her post-tax disposable income, I_p , can be expressed as

$$I_p = (1 - t)y_p + \theta. \quad (3)$$

The equilibrium tax rate is the one that maximizes I_p . The focus of the present analysis is the relation between pre-tax income distribution and redistribution. Income inequality affects the equilibrium tax rate through two channels. First, by affecting the gap between the average and the median income. Second, by affecting the incentives for tax avoidance. We start by

studying a situation with no tax avoidance, so that the only constraint on the redistribution system is the efficiency loss in taxation.

2.1 Without tax avoidance

Without tax avoidance, $\hat{y}_r = y_r$. The objective function of the median voter (3) can then be expressed as:

$$I_p = (1 - t)y_p + ty(1 - bt). \quad (4)$$

The median voter's optimal choice of tax rate without tax avoidance, t_a^* , can be found by maximizing I_p , which results in:

$$t_a^* = \frac{n_r(y_r - y)}{2yb(1 - n_r)}. \quad (5)$$

The tax rate is increasing in y_r and is decreasing in the size of b . For a given number of rich and poor individuals (n_r and n_p constant) y_r can be seen as a measure of inequality.⁴ Increased inequality will thus increase the equilibrium tax rate.

The result that the higher the gap between average and median income, the higher is equilibrium taxes, is not surprising. Indeed, this result can be found in standard median voter models of taxation, see for instance Roberts (1977) and Meltzer and Richard (1981), that describe the median solution when the effect of taxes on incentives to work are taken into account. A similar result can be derived from welfare maximization in the optimal tax literature, see Sandmo (1976).

2.2 With tax avoidance

We now open up for tax avoidance as a second constraint on redistributive taxation. We follow Cowell (1990) and assume that the cost of tax avoidance (C) involves both a fixed cost (m) and a variable cost (c):

$$C = m + c(y_r - \hat{y}_r). \quad (6)$$

⁴Inequality can also increase in other ways, e.g., by reducing the number of rich people holding the share of income received by the rich people as a group constant. The qualitative results in our model do not depend on how an increase in inequality is modelled.

The fixed cost includes accountants' fees and various transaction and travel costs to fulfill the residency requirements to tax abroad. As in Cowell's analysis, we assume that there is a zero tax rate in the tax haven. This assumption is not essential. What matters is that the tax rate is low.⁵ The variable cost c could reflect the costs associated with currency conversion, or a variable component in the accountants' fees.

The gain from tax avoidance, G , for a rich person is given by

$$G = (t - c)(y_r - \hat{y}_r) - m. \quad (7)$$

With this formulation, a rich person either transfers all her income to the tax haven, or does not avoid taxation at all. If she reports all income at home, she pays ty_r in taxes. Sheltering the entire income from taxation costs $m + cy_r$. The critical level of t , which we call \bar{t} , for which a rich person is indifferent between avoiding taxation or not is then given by the condition $ty_r = m + cy_r$, which can be expressed as:

$$\bar{t} = c + \frac{m}{y_r}. \quad (8)$$

Clearly, for given avoidance costs, a higher income for a rich person makes her more inclined to avoid taxation, and therefore reduces the critical tax level \bar{t} . Obviously, a higher fixed or variable cost of evasion increases \bar{t} .

The critical tax rate \bar{t} constitutes a ceiling on the tax rate that a poor median voter will vote for. Voting for $t > \bar{t}$ would not be optimal, since the transfer program would break down due to tax avoidance. The equilibrium tax rate is therefore given by:

$$t^* = \min(t_a^*, \bar{t}). \quad (9)$$

There is a critical value of pre-tax income inequality, \bar{y} , below which $t_a^* < \bar{t}$ and above which $t_a^* > \bar{t}$. Figure 1 illustrates how the tax rate, t^* , varies as a function of our measure of pre-tax inequality y_r .⁶

We observe that:

Lemma 1 *The optimal tax rate is a hump-shaped function pre-tax inequality. To the left of \bar{y} , the tax rate increases with higher pre-tax inequality, to the right of \bar{y} , the tax rate falls.*

⁵Although we do not model the choice of tax rate in the tax haven explicitly, we can think of the low tax rate as the result of a Bertrand competition in tax rates between a number of small countries without any domestic tax base of their own.

⁶The numerical values in the figure is $b = 1, y = 0.5, n_r = \frac{1}{4}, m = 0.2$, and $c = 0.05$.

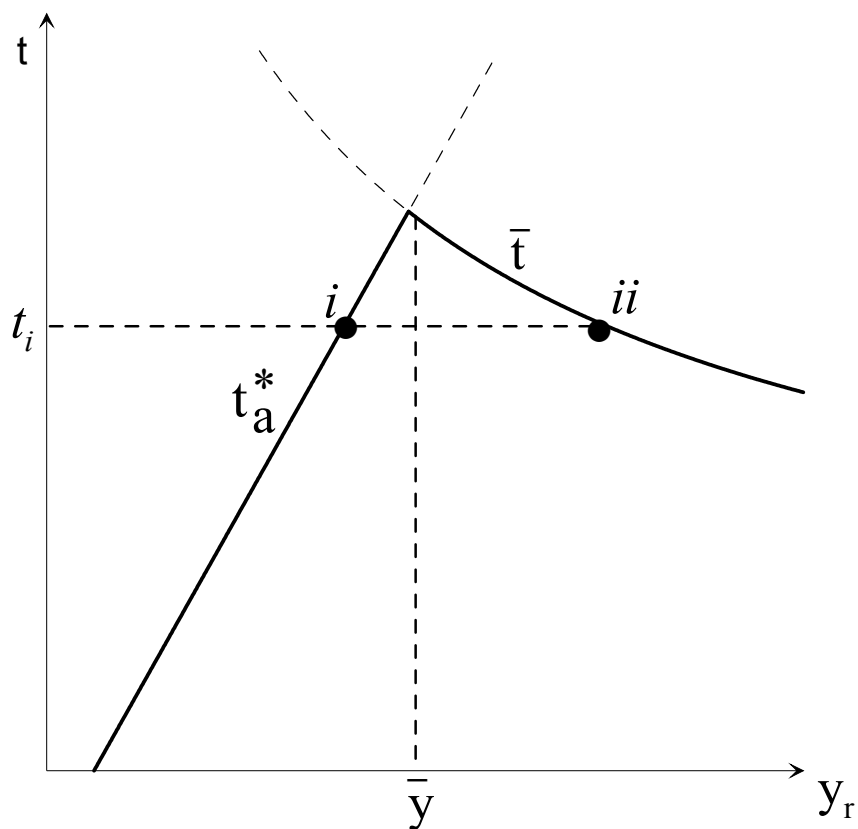


Figure 1: Pre-tax inequality and taxation

To the left of \bar{y} , the dead weight loss is the binding constraint, and the tax rate follows the upward sloping t_a^* -curve. An increase in the tax rate is possible here without causing tax avoidance, but the dead weight loss constraint limits the median voter's eagerness to implement ambitious tax and redistribution programs. To the right of \bar{y} , the downward sloping \bar{t} -line is the binding constraint. A higher tax would clearly not be chosen since, as argued above, this would cause the tax base to disappear through tax avoidance.

Figure 1 is consistent with the observations on income inequality and redistribution discussed in the introduction of the paper. It follows from the hump-shaped relationship between income inequality and redistribution that, at any point in time, countries with low levels of pre-tax inequality may have

higher tax rates than countries with high levels of pre-tax inequality. Typically, however, empirical investigations into the relation between inequality and redistribution fail to generate very robust results. Our model also offers an explanation to why this may be the case. Since our prediction is that the relation between inequality and redistribution is non-linear, using a linear regression model to capture this relationship would represent a functional form mis-specification, which in turn would lead to biased estimators.

It also follows from the hump-shaped relation between tax rates and pre-tax inequality that a country's response to increased pre-tax inequality may change over time. For low initial levels of inequality, more precisely, for $y_r < \bar{y}$, an increase in market income inequality will be partly offset by higher taxes. However, if the pre-tax inequality continues to rise, for instance as the process of globalisation continues, there will at some point be a qualitative change in policies. When pre-tax inequality reaches a level higher than \bar{y} , then a further increase in pre-tax inequality will be met by lower taxation. In this case, the changes in tax policy will augment the effect of increased pre-tax income inequality on the distribution of disposable income. We can summarize this discussion as:

Proposition 1 *The effect of an increase in pre-tax income inequality on tax policy depends the initial level of pre-tax income inequality. Increased pre-tax inequality for a country characterized by $y_r < \bar{y}$ will lead to higher taxes, which reduces the impact on disposable incomes. Increased market income inequality for a country characterized by $y_r > \bar{y}$, on the other hand, will lead to a reduction in taxes, thus reinforcing the impact on disposable income inequality.*

To see the effect of an global increase in pre-tax inequality, consider for the two countries characterized by i and ii in Figure 1. Initially, these two countries have equal tax rates, given by t_i . However, increased pre-tax inequality in both countries leads to an increase in the tax rate of the country starting at point i , and a reduced tax for the country starting at ii . Hence, increased pre-tax inequality in this case causes a divergence of tax rates between countries. This mechanism provides a possible explanation for the different responses to increased pre-tax inequality in countries such as Canada and USA, Finland and the UK.

Note that increased pre-tax inequality in the present model may lead to lower tax rates even if, in equilibrium, there is no tax avoidance in equilibrium. It is *potential* tax avoidance that affects the taxation and redistribution

program. This is an important point since it demonstrates that tax evasion and tax avoidance may be important constraints on redistribution policies even if we do not observe a lot of tax avoidance in practice.

2.3 Reduced costs of tax avoidance

An interesting question is how a reduction in the costs of tax avoidance affects equilibrium tax rates. As mentioned in the introduction, one effect of globalisation, and the associated increase in cross-border mobility, might be to reduce the costs of tax avoidance. From (8) it is straightforward to demonstrate that:

Lemma 2 *A reduction in c or m reduces \bar{t} and therefore reduces the critical value of pre-tax inequality, \bar{y} , at which point the policy response to increased pre-tax inequality changes from increased tax rates to reduced tax rates.*

Hence, lower costs of tax avoidance imply that a country that experiences increased pre-tax inequality, at an earlier point in time, or more precisely, at a lower level of pre-tax inequality, will change its tax policy response from increased tax rates to reduced tax rates. In Figure 2 the reduction in avoidance costs is captured by a change from \bar{t}_1 to \bar{t}_2 . This shift also reduces the critical value \bar{y} , in the figure from \bar{y}_1 to \bar{y}_2 . Clearly, the tax rate goes down for $y_r > \bar{y}_2$, and remains unchanged for $y_r < \bar{y}_2$.

From Figure 2 it is also evident that a reduction in tax avoidance costs may result in either convergence or divergence of tax rates internationally. Consider three countries, a relatively egalitarian one characterized by y_r^i , a less egalitarian one characterized by y_r^{iv} , and the more inegalitarian with income inequality given by y_r^{ii} . Before the reduction in tax avoidance costs, the tax rates in the most egalitarian and the least egalitarian country are both given by t_i , while the moderately inegalitarian one has $t > t_i$. A reduction in avoidance costs such that the tax ceiling curve shifts from \bar{t}_1 to \bar{t}_2 causes the tax rate for the most inegalitarian country to drop from point *ii* to *iii*, such that $t < t_i$. For the moderately inegalitarian country, the change is from point *iv* to *v*, such that $t = t_i$. The tax rate of the most egalitarian country is unaffected by the drop in tax avoidance costs. Hence, there has been a convergence in the tax rates between the most egalitarian country and the moderately egalitarian one, and a divergence in tax rates between the most inegalitarian and the most egalitarian countries. Hence, we can conclude that:

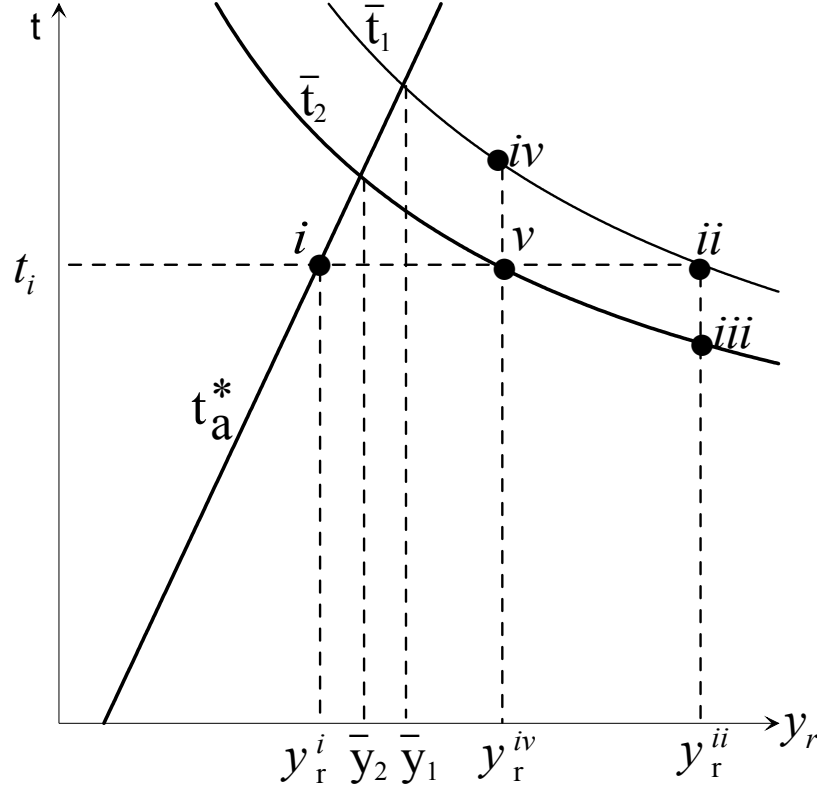


Figure 2: A reduction in tax avoidance costs

Proposition 2 *Depending on the level of pre-tax income inequality, a reduction in tax avoidance costs may lead to a convergence, divergence, or no change at all in international tax rates.*

Our analysis therefore demonstrates that not only an international increase in pre-tax income inequality, but also an international reduction in tax avoidance costs, may lead to diverging outcomes between countries. This is important, given the diverging experiences of countries' redistribution policies reported in the introduction to the paper.

3 Conclusion

Market income inequality has risen in most OECD countries, and many attribute this development to increased globalisation. Moreover, globalisation also challenges the ability of the welfare state to implement ambitious tax and redistribution programs. Empirically, we have witnessed a reduction in the redistributive “efforts” of governments. In some countries, like the United States and the United Kingdom, the decline in redistributive policies took place in the 1980s, and these two countries have seen a sharp increase in disposable income inequality since then. Other countries, like Canada, Sweden, Finland, the Netherlands, etc., have managed to dampen the effect of globalisation on people’s disposable incomes. But there are signs that even in these more egalitarian societies policies have changed since the mid-1990s, leading to a sharper increase in disposable income inequality also there. The present model offers an explanation to these patterns of redistribution in a time of increased market income inequality.

Based on the idea that there are two constraints on countries’ taxation and redistribution programs, namely dead weight loss and tax avoidance, we show that the optimal tax rate is a hump-shaped function of pre-tax income inequality. Hence, given an increase in pre-tax inequality, the political economy response is first to limit the impact of market income inequality on disposable incomes by increasing redistribution. A continued increase in pre-tax inequality, however, will at some point change the policy response to a reduction in tax rates. Beyond this point, therefore, there will be a sharp increase in disposable income inequality.

In our model, pre-tax incomes are exogenous. We have tied changes in this exogenous variable to the process of globalisation. An interesting extension would be to make not only taxation and redistribution but also pre-tax incomes a function of policy choices. For instance, health, education, and labor market policies may affect pre-tax income distribution in interesting ways. One interesting question is whether, in an era of globalisation, it is more efficient to try to equalize pre-tax incomes rather than after-tax incomes. We leave this for future research.

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