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[Consider costs and benefits: Very preliminary and incomplete thinking out aloud]

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Voxi Heinrich Amavilah

Abstract: There is sufficient microeconomic evidence that holidays are important to economic life. Is there similar support at the macroeconomic level? This exploratory paper uses a simple approach to assess the impacts of holidays on the economic growth rates of 182 nations in 2002. It finds that the human development level has a larger effect on economic growth rate than holidays. At the aggregate level holidays affect economic growth positively, but in a statistically insignificant way. For example, increasing by one day the number of holidays per year adds 0.30% to annual growth rate. Unlike non-religious holidays, religious holidays, whether Christian or non-Christian, affect economic growth negatively. The results are meaningful, yet statistically weak insofar as their explanatory power is only around 20%. They suggest that instruments for holidays, such as total sales revenue during holidays ,or something, other than the number of holidays, may be better explanatory variables. One can think of any number of fixes like remodeling the problem, choosing alternative estimators and/or functional forms. For now, those fixes belong to future efforts. **JEL Classification: O47, E13, D60, C2, C5**.

Keywords: Holidays, economic growth, Madonna, human development index (HDI)

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A holiday is an official or unofficial time off a regular schedule of activities in observance of other periodic activities of religious, cultural, occupational, and/or festive significance. Holidays are important in human life, for good or bad. One example. In her enormously popular song, *Holiday*, pop-singer Madonna declares: "If we took a holiday Took some time to celebrate, ... it would be so nice. ... One day to come together To release the pressure We need a holiday. .. To come together and make things better we need a holiday" (Madonna, 1983).

Almost anyone would agree with Madonna. In the USA Mother's Day generates no less than $20 billions in sales revenue. Because of its global acceptance, Christmas is even a bigger business day. However, although it is obvious that holidays and other festive days are important to the economic sphere of human life, there is little quantitative analyses of the effects of holidays on the economic growth of nations. This paper fills some of the existing gap by estimating the impact of holidays on the economic growth of a cross-section of 182 nations in 2002 for which reasonable data is available. In the next section I summarize the little I could find in the literature on the subject. Section 2 specifies the empirical model to be estimated. Section 3 describes the data and the estimation method, while Section 4 presents the results. I conclude with Section 5.

1. Holidays in the literature

The significance of holidays seems trivially self-evident. On one side, most countries observe at least one holiday a year even though individuals in those countries may have differing reasons for observing or not observing that holiday - that is one piece of general evidence. At the microeconomic level, my ten-year-old daughter tells me that holidays are important for presents (and family get-together). From a related and more serious angle, hours of work lost to holidays may reduce firm productivity; but holidays may also invigorate workers so that productivity goes up higher after than before the holiday. I can see a variety of ways in which the preceding statement can be tested, but I resist the temptation to spoon feed the reader. What I would say is that either way holidays add something significant to human life. However, the economic literature on the impact of holidays on economic growth is very limited, although indirect references have been made both in recent and distant literature.

In the distance, Morris Silver's (1995) *Economic Structures of the Antiquity* attributes an important role to symbolic representations like holidays that promote the accumulation of trust as capital. Trust enforces contracts and facilitates economic growth. In *The Economic Growth of the West*, Angus Maddison (1964) worries about the problem posed by the lack of information on the number of holidays in the calculation of working hours, except for Great Britain. His Appendix G (p. 227) shows the number of holidays increasing along with an increase in productivity and wages. Although the number of holidays across countries are now common information, the connection between holidays and economic growth remains underexplored.

Recently, and in mostly popular writings, one sees some mention of the impact of

holidays on growth. For example, in 2003 a senior Indian government official caused a stir when he claimed that a "holiday syndrome is a major hurdle to the economic growth" of that country (Financial Express, 2003). Too many holidays, especially by government employees, was weakening India's competitiveness in the telecom sectors, he argued. A study by Ramasamy, Yeung, and Au (2008) estimates the effects of holidays on domestic private consumption in Hong Kong, and finds that increasing holidays by a day a quarter raises private consumption significantly, and consequently GDP also goes up by 0.34%. China re-instated four traditional festivals that were banned during Mao's socialistt dispensation (hktdc.com, 2007). Evidence from the re-instatement of the four festivals shows an increase in consumer spending of up to 17% in 2007 from 15% the same time in 2006. In some cities retail sales increased by as much as 40% as a direct result of the Lunar New Year and other so-called "golden week holiday" celebrations (China.org.cn, 2007).

In a very innovative paper J. Merz and L. Osberg (2006) examine whether holidays facilitate leisure time coordination. They find that holidays do not constrain the annual amount of leisure; instead they are needed because they are beneficial to social life - holidays are for "keeping in touch" - the title of the paper. One reading of the link between holidays and social life is its implication for social capital formation, and of equal value human capital building. This connection is consistent with Amartya Sen's "capabilities approach" to human welfare, in which welfare is measured by the human development index (HDI), see Sen (1979), Anand and Sen (1994) and Dolan (2002).

Again, does that mean that holidays are important to the economic growth of nations? How can we know? Here is where the literature is scanty to the point of being silent. However, one can go back to P.H. Douglas' (1934) analysis of leisure-work time allocation in which he shows that the propensity to work declines with income growth, while productivity increases. Harold Wilensky (1961) re-interprets Douglas as meaning that "free time", also called "the new leisure" is an inverse function of economic growth. The income effect of high wages is that workers can buy more leisure time. On the other hand, high wages also mean the opportunity cost of holiday (leisure) is high. Thus the net effect may be indeterminate. This paper turns Wilensky around: It asks, not whether the growth of income affects leisure, but rather whether holidays (leisure) affect economic growth across nations.

The preceding question is not entirely new. In a follow-up on the Douglas-Wilensky proposition, Best, Bosserman, and Stern (1979) find that, given a choice, U.S. workers would prefer wage increases to leisure time increases, although the gap is closing. Jesse Ausuble and Arnuff Grubbler (1995) suggest that human longevity depends very much on leisure. As worker income rises and the workweek shortens people live longer than before. Productivity also increases, which indicates that leisure influences human capital building. This idea fits comfortably in Sen's capabilities approach by which human development is a function of the material conditions (real GDP per capita) and human capital (education - literacy rates and gross enrollment ratios - longevity (life-expectacy). It is not too far from here to posit that leisure is important to economic growth, i.e.,

y= f(H(Leisure, etc.)), H= human capital.

In fact, Wei, Qu, and Ma (undated) explore a neoclassical growth model in which leisure time has two "compensating effects on growth: "advancing by leisure" and "learning by leisure" (p.3). *Advancing by leisure effect* is an idea from psychology by which healthy and positive leisure activities benefit H-formation. The *learning by leisure effect* suggests that leisure activities like travel have a technological externality that "enhances willpower and creativity, ... [and therefore] could inspire innovation" (p. 3). The latter idea is just an application of Paul Romer's (1990) learning by doing model. Assessment of the two compensating effects reveals that leisure time has affected China's growth negatively, although the "degree of the impact of leisure depended on the stages of economic development" (p. 7). What is the corresponding evidence across nations? - that is the issue here.

2. Empirical model

I justify my model with a maintained assumption that a country is a collection of households with identical preferences described over an infinite time by a utility function (U). Following Sen's capabilities approach, I assume that countries obtain their utility from their level of human development, measured by the human development index (HDI = *x*). The Lagrangian problem for countries then is to maximize U(x) subject to their production restraint. By the Lagrange-multiplier method that is saying

$$Z= \max U(x)+ \lambda F(x),$$

for which the necessary and sufficient conditions hold (at least by assumption). I do not pursue Z in this paper. Instead, I characterize *x* and F(x), and link them with holidays (*q*) for estimation purposes.

To begin, assume there exists some real-valued function

$$Ne^{x}= H^{a}Y^{b}, \quad a+ b \leq 1, \qquad (1)$$

where N is a human population base for *x*, H is the human capital dimension of *x* and is inclusive of education and longevity of the population, Y is the material condition of the population measured by GDP in purchasing power parity, and *a* and *b* are weights. I express H in two different ways:

$$H= \frac{1}{1+ e^{\phi q}N} \qquad (a)$$

$$H= e^{\phi q}N \qquad (b)$$

$$(2)$$

The expressions 2(a) and 2(b), appropriately transformed, are equivalents except for the differing arithmetic sign of ϕ. Ignoring 2(b) and substituting 2(a) in (1) gives

$$Ne^{x} = (\frac{1}{1+e^{\phi q}N})^{a}Y^{b} = ([1+e^{-\phi q}N]^{-1})^{a}Y^{b}. \tag{3}$$

Dividing (3) through by N gives

$$e^{x} = (1+e^{-\phi q})^{a}y^{b} = 1+e^{-a\phi q}y^{b}, \quad y = Y/N. \tag{4}$$

Since $y^{b} = e^{x+a\phi q} - 1$, it follows that

$$y = e^{\alpha x + \beta q} - 1, \tag{5}$$

where $\alpha = 1/b > 0, \; if \; b > 0 \; \wedge \; \beta = a\phi/b > 0, \; if \; a\phi > 0$. I can now estimate (5) as simply

$$lny = \alpha x + \beta q, \tag{6}$$

where if $\beta > 0$, H is of the form 2(a), and H is of the form in 2(b) if $\beta < 0$. To the extent there is a link between social life and holidays, and social life and human capital, holidays belong to q (Merz and Osberg, 2006, and Wei, Qu, and Ma, 200x), so that (6) says

$$Economic \; Growth = \alpha \; (HDI \equiv x) + \beta \; (Holidays \equiv q) \; + \; (Everythingelse \equiv e). \tag{7}$$

From here the focus turns to estimating (6). One can then use the estimates of α and β to make general statements about two key relationships. First and most obvious is the technical efficiency of y (ξ_y), which is

$$\xi_y = e^{y-\hat{y}}, \tag{8}$$

where $\xi_y > 0$ implies (6) underestimates the relationship between hypothetical (6) and the true (6), whatever that is, and $\xi_y < 0$ is an overestimation.

Table 1 - Descriptive statistics*

Name	N	Mean	St. Dev	Variance	Minimum	Maximum
GY	182	1.830	6.355	40.387	-14.830	46.390
HDI	182	0.697	0.177	0.031	0.273	0.956
TH	182	13.79	6.046	36.564	2.000	54.000
CH	182	4.170	3.300	10.893	0.000	20.000
NCH	182	2.703	4.477	20.044	0.000	32.000
RH	182	6.857	4.602	21.184	0.000	36.000
NR	182	7.065	3.636	13.222	0.000	24.000
COH	182	1.670	0.6139	0.37690	0.000	3.000
OH	182	5.395	3.558	12.660	0.000	22.000

* GY = Rate of economic growth
 HDI = x = human development index
 TH = Total Holidays = total number of holidays in a typical year
 CH = Christian Holidays in a typical year
 NCH = Non-Christian Holidays in a typical year
 RH = CH + NCH = Religious Holidays in a typical year
 NR = TH - RH = Non-religious Holidays in a typical year
 COH = Common Holidays (New Year's and Labor Day for most countries)
 NH = Nation-specific Non-religious Holidays

Table 2 - Variable correlation matrix*

	GY	HDI	TH	CH	NCH	RH	NR	COH	OH
GY	1.0000								
HDI	0.0298	1.0000							
TH	-0.0623	0.085464	1.0000						
CH	-0.0170	0.30551	0.4009	1.0000					
NCH	-0.0521	-0.098907	0.5346	-0.3225	1.0000				
RH	-0.0627	0.12200	0.7997	0.4045	0.7339	1.0000			
NR	0.0334	-0.0068609	0.5876	0.1611	-0.0446	0.0642	1.0000		
COH	-0.0954	-0.0079343	0.0929	0.3332	-0.2589	-0.0089	0.2102	1.0000	
NH	0.0506	-0.0056425	0.5844	0.1071	-0.0009	0.0672	0.9856	0.0423	1.0000

* GY = Rate of economic growth
  HDI = x = human development index
  TH = Total Holidays = total number of holidays in a typical year
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  COH = Common Holidays (New Year's and Labor Day for most countries)
  NH = Nation-specific Non-religious Holidays

Second, since $y = e^{\alpha x + \beta q} - 1$ and $\hat{y} = e^{\hat{\alpha}x + \hat{\beta}q} - 1$, then

$$q = \frac{\ln y - \alpha x}{\beta} \quad (a)$$

$$\hat{q} = \frac{\ln \hat{y} - \hat{\alpha}x}{\hat{\beta}} \quad (b).$$

(9)

The theoretical optimality of q (ξ_q)

$$\xi_q = q - \hat{q}.$$

(10)

True α and β are unknown so that 9(a) is only theoretical - it cannot be solved. We still can say that if ξ_q and ξ_q are nonzero, then significant instances of inefficiency characterize economic growth.

3. Data

This paper is data economical, which is good for situations where relevant data is a problem; data economy is bad in every other way that scarcity of anything is bad. In any case, there are only three variables and corresponding data series of interest: one dependent variable (y), and two independent variables (human development index (HDI = x) and holidays (q)). The data for y comes from the Penn World Table 6.2 (Heston, Summers, and Aten, 2006). HDI is from the *Human Development Report* 2004 and www.nationsonline.org. Where the HDI data is unavailable, appropriate averages are substitutes. For example, there is no 2002 HDI data for Afghanistan. I use the average HDI of the least developing countries and developing countries. For Bermuda I use the average of the low-income and developing countries. For Iraq the average is of the developing countries and Arab countries. For North Korea I use the HDI average for low-income countries, while Kiribati HDI is taken to be the average of developing and East Asian and Pacific countries, and for Palau it is the HDI for the least developing countries.

Variable q is the number of holidays and other festivities. My original interest was in public holidays, but available data is too difficult to sort out and understand well. Hence, holidays here mean *all holidays.* This means that I do not distinguish between "leisure time" and "free time." I use three main sources: http://www.diversityresources.com, http://www.worldtravelguide.net/country/290/public_holidays/, and http://en.wikipedia.org/List_of_holiday_by_country.

Each country has a certain total number of holidays (Total Holidays). Of this number some

Table 3 - Holidays and the economic growth of 182 nations in 2002
(Parentheses are t-ratios; R-square is between observed and predicted)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
HDI = x	0.697 (2.877)	0.538 (1.969)	0.643 (2.440)	0.576 (1.757)	0.626 (1.982)
Total Holidays	0.003 (0.254)				
Religious		-0.019 (-0.974)		-0.019 9-0.951)	
Christian			-0.047 (-2.029)		-0.047 (-1.908)
Non-Christian			-0.011 (-0.535)		-0.011 (-0.533)
Non-Religious		0.042 (1.659)	0.045 (1.799)		
Common				0.018 (0.166)	0.044 (1.729)
Nation-specific				0.044 (1.696)	0.057 (0.494
DW[ρ]	1.9576[0.0005]	1.9760[-0.0090]	1.9709[-0.0060]	1.9711[-0.0060]	1.9734[-0.007]
R-square	0.2044	0.2263	0.2337	0.2265	0.2338

holidays are Christian (Christian Holidays) and others are non-Christian (Non-Christian Holidays), where Christian Holidays + Non-Christian Holidays = Religious Holidays. Still other holidays are secular (Non-religious Holidays). Some countries have common secular holidays (Common Holidays), with the remainder being specific only to one country (Nation-specific Holiday). As Sue Thompson (2000) and M.. McDonald (1992) separately point out, holidays celebrate defining moments, but the celebrations themselves differ even within one country. In fact, I find that the sample of countries in this study share mainly only two holidays: New Year and Labor (Workers') Day. Table 1 gives descriptive statistics and Table 2 displays a correlation matrix.

4. Preliminary results

I apply the OLS estimator to (6) and White (1980)-adjust it. Table 3 presents *preliminary* results in five versions of the estimation. Across all five versions the impact of human development on the economic growth of nations is strongly positive. For example, a dollar's worth of improvement in the HDI = x of a country contributes no less than $0.50 to economic growth. The number of holidays has an insignificant effect on the economic growth of nations, which breaks down into a negative contribution from religious holidays and a positive one from non-religious holidays. The negative effect of religious holidays on economic growth persists even when religious holidays are divided into Christian and non-Christian holidays. On the other hand, non-religious holidays have a positive effect even when spilt between holidays that are common to all countries (New Year and Labor/Worker Day), and those that are nation-specific like, Independence Day.

Although the results are reasonable, I should mention that the explanatory power of the regressions is very low, so low in fact that the adjusted R-square is negative. A negative R-square is not unexpected in regressions in which the constant term is absent. I suppressed the constant term because nearly all countries in the sample have two holidays in common (New Year and Labor Day). In general the R-square between actual and predicted observations ranges from 20% to 24%. This is not unreasonable as it suggests that nearly one quarter of the variations in economic growth is explained by x and q.

A close examination of the relationship between actual and estimated y reveals that the log spread between them falls in the 0.2-0.8 range for most countries. The distance between actual q and estimated q is also clear. In fact, there is a discernible downward trend with high growth countries tending to have fewer holidays. There is no doubt that ξ_y and ξ_q are nonzero.

5. Conclusion

Because the results are preliminary, the conclusion from them is tentative. In general, it is clear that, other things being equal, the level of human development matters significantly to economic growth. Holidays are important, but perhaps not as important at the macroeconomic level as they are at the microeconomic level. It may also mean our measure of holidays is inadequate. When holidays are disaggregated, the results show that they have

negative impacts on economic growth; when aggregated they support positive effects on economic growth. Perhaps holidays should matter more, and in varied ways, than the findings of this study show. Clearly, in developed nations holidays generate a lot of sales. Valentine's Day generates $15 billion of business. These results can be improved by including information on consumer spending habits on holidays as regressors rather than the number of holidays. Until that is done, the tentative conclusion is that, although work creates non-productive stress, and some time off work for celebration is necessary, as Madonna sings, countries cannot hope to grow faster just by increasing the number of holidays per year.

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