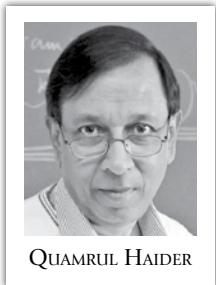


The Great Conjunction of Jupiter and Saturn

A rare planetary alignment not seen in 800 years



QUAMRUL HAIDER

ON December 21, the first day of winter this year, the two gaseous giants in the solar system—Jupiter and Saturn—will put up a spectacular display in the evening sky. They will be so close that they will appear, from our perspective, to overlap completely, creating a rare “double planet” effect. However, while they may appear to the naked eye extremely close, within 0.1 degree of each other, in reality, they are separated by more than 400 million miles. To visualise this distance, a 0.1 degree separation is about the thickness of a dime held at arm’s length. This celestial synchronisation, also referred to as the “Christmas Star,” has not occurred in nearly 800 years. Last time they were so close together was on March 4, 1226.

The spectacle is a curious effect of their orbits around the Sun. Since Jupiter takes 11.9 years to circle the Sun and Saturn 29.5 years, the faster moving Jupiter catches up with the slower moving Saturn and overtakes it roughly every 20 years. Astronomers call the moment of overtaking “Great Conjunction.”

At conjunction, separation between two objects in the sky as viewed from Earth is a minimum. Moreover, at great

conjunction, Earth, Jupiter and Saturn align themselves along a straight line so as to make the two Jovian planets appear very close together. Great conjunctions are rare though because more often than not, Earth is not aligned along a straight line with Saturn and Jupiter when they are at conjunction. The duo will then appear to be separated by a few degrees.

Furthermore, the event can happen while the Sun is up blocking the conjunction from view. Indeed, during the last great conjunction on May 31, 2000, the planets never came anywhere as close together as they will this month. Besides, we could not see the overlap because the alignment occurred too close to the Sun and thus was lost in the glare of the twilight. The same was true the time before, in December of 1980.

This time around, after sunset on Monday, December 21, which is also the winter solstice, Jupiter and Saturn will appear to the unaided eye as a single bright object low in the southwestern sky. This dazzling display of two celestial objects kissing each other on the longest night of the year can be seen from everywhere in the world. It will become visible in Bangladesh soon after sunset but only for a short time. The conjoined planets will sink below the western horizon about an hour later. Also, the further north viewers are, the less time they will have to catch a glimpse of this astronomical event.



An artist's rendition of what the alignment of Earth, Saturn and Jupiter will look like on December 21, 2020.

COURTESY: AUTHOR

How can we spot the planets with naked eye? In the weeks leading up to the great conjunction, Saturn will be to the upper left of Jupiter, slowly dancing toward Jupiter. On clear nights, unlike stars which twinkle,

Jupiter and Saturn will hold consistent brightness, making it easier to spot them amidst the myriad of objects in the stellar zoo. Although Saturn will be slightly dimmer and smaller in size, yet it will be just as bright as the

brightest stars, with a recognisable golden glow. An amateur telescope or a high-power binocular will show the planets in more detail, including the Galilean moons of Jupiter—Io, Europa, Ganymede and Callisto.

We do not have to wait until December 21 to view this dazzling conjunction. They are already a pretty pair in the sky, and will remain so through the entirety of December. Nevertheless, after December 21, Jupiter will start moving eastward, separating from Saturn. Additionally, during early evening hours, the planetary pair will appear lower in the sky, albeit appearing near each other for about a month, giving sky watchers plenty of time to witness the amazing alignment throughout the holiday season.

If you miss the spectacle this year, you should not expect to see it in 2040 or 2060. The next great conjunction, with a separation of about 0.2 degree, will occur on March 15, 2080. After that, it will be 2417 and 2477.

Finally, dating back to Kepler's time in the 17th century, some astronomers hypothesised that the Star of Bethlehem that guided the Three Magi—also known as the “three wise men”—to Christ's birthplace was a conjunction like the one we will witness on December 21. It could be but involving different planets.

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Why have India's new farm bills riled up the farmers?



ASAD RAUF

FOR nearly three weeks, India has been witnessing massive protests from farmer organisations across the country. The protests are in response to three farm bills that the Narendra Modi government enacted as laws without much consultation with the stakeholders. Even the upper house of Indian parliament, Rajya Sabha, was left short-changed when these three bills were passed via voice vote, ignoring opposition demands for wider consultation and deliberation. After months of discontent, and almost no attempt by the central government to allay fears, farmer organisations finally started marching to New Delhi to force the government to take their angst seriously. What has ensued since then is a stand-off. The government had underestimated the anxiety amongst farmers who called for a complete rollback of these laws. However, given Mr. Modi's image of a strongman, no-nonsense leader, a full rollback would be extremely detrimental to his image.

So what exactly are these laws that have riled up farmers so bad? The issue is complicated. Agriculture is a heavily regulated industry and, importantly, within the ambit of the state governments in India. Thus, agricultural laws were always state-specific, and countrywide reforms were always difficult and required consensus building.

Consensus building, however, was never really one of Mr. Modi's strong suits. Under the advice of a few experts, and under pressure to appear to rescue a crippled economy, Mr. Modi brought three laws that massively overhaul the existing rules regarding how farmers sell their produce. These new laws overhaul the existing agricultural markets of every state in India as the central law weakens the states' own laws on agriculture. The lack of any consultation with state governments, farmer organisations, and even parliamentarians (whose job it is to discuss and enact laws) makes farmers view these laws with suspicion. After all, whenever Mr. Modi has embarked on grand policy announcements, the outcome has generally been disastrous. Lack of consultation was central to those policy disasters (prominent among them being demonetisation).

The details of these laws are complicated but essentially there are two pain points for farmers. The first is allowing the entry of unregulated entities (e.g. major corporations) to directly contract with farmers, buy agri-products and stockpile them at their whims. The second, although not mentioned in these

laws, is the fear that the government will scale down its procurement of grains, and as a result, lakhs of farmers who sell their produce to the government will be left at the mercy of large corporations. Government procurement occurs at decently remunerative prices called Minimum Support Prices (MSPs). Farmers fear that the prices they will get as a result of these new laws will be exploitative and far below MSPs.

In the past, farmers could only sell their produce at designated markets called APMCs (the laws, however, were different in different states). APMCs, short for Agricultural Produce Market Committees, are regulated and state-controlled markets where traders need to register before they can purchase products from farmers. APMCs have regular auctions to facilitate price discovery and generally levy a fee on transactions that happen inside their wholesale markets or *mandis*. The new farm laws now allow buyers and traders to bypass *mandis* and buy directly from farmers. Anyone with an Indian PAN card can now buy from farmers directly. One might ask,

away from the APMC markets and will want to purchase directly from the farmer (the APMC markets will, therefore, collapse).

The question is what such a market outside the APMCs will look like. Proponents of these laws argue that this will create larger private markets which will lead to better price realisations for farmers. The concern is that such would be the case only if the entry barrier for new buyers was indeed a major issue. On the other hand, if allowing anyone to buy brings few new buyers and existing buyers simply move outside the regulated APMC framework, then the resulting markets will be opaque where farmers can easily be exploited. Since these will be private transactions with no reporting framework, the government will lose oversight of the price discovery mechanism, leaving farmers in a free-for-all market. Farmers fear that such a “free market” where they have little or no bargaining power would be undeniably exploitative.

Proponents also argue that the entry of corporates will bring bigger players to the market and this will

purchases of grains create incentives for farmers to stick to crops which are likely to be purchased by the government. Thus there is excess supply. There is a hint (although the government at the moment denies this) that it will scale down these purchases, thus forcing farmers to shift away from these water-guzzling crops. The trouble here is that the overhauling of the procurement systems passes the burden of switching costs entirely onto the farmers. Farmers need better incentives to diversify to other crops, not threats of closure of public procurement. Any equitable reform would first create incentives for farmers to switch before scaling down procurement. Such “reforms” where farmers bear the costs are grossly

unfair.

Any student of economics would argue that “free markets” with more competition are surely better for sellers. Thus those in favour of liberalisation have, by and large, cheered these laws. However, one needs to ponder how “free” these markets will really be. For example, whenever there is a whiff of onion prices going high, the Indian government swiftly bans exports, thereby denying the farmers the benefit of higher prices. Is that reflective of a free market? Secondly, the government appears beholden to corporates, and that too a select few. Corporates in India can now legally and discreetly channel massive amounts of funding to political parties via obscure Electoral

Bonds. The people of India have no recourse to knowing how much corporates are donating and under what quid-pro-quo arrangements. Thus, to trust a government to come on the side of farmers is difficult. In fact, some of the clauses in these new laws explicitly forbid farmers from dragging corporates to courts! Therefore, it is difficult to place trust in free market forces to ensure the welfare of farmers in such crony capitalist settings. “Free market” then becomes a guise for exploitation which ultimately begets social inequality. Farmers in India have sensed this better than many economists.

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File photo of demonstrators gesturing during a protest against the newly passed farm bills at Singhu border near New Delhi, India, on December 10, 2020.

PHOTO: REUTERS/ANUSHREE FADNAVIS

what is so troubling with this? After all, this is providing the farmers with a “choice”—they can always choose to sell at the APMC market if they wish. More choices should naturally lead to higher farmer incomes.

The trouble is, this theoretical argument ignores a lot of market frictions which could lead to undesirable outcomes for the farmers. For example, one feature that best characterises farmers in India is that most of them are small and marginal. More than 86 percent of farmers have a landholding of less than 1 hectare. Hence, most farmers have limited or no bargaining power. The new laws incentivise traders and buyers to do their trade outside APMC *mandis*, by not charging any taxes and fees which are usually levied on transactions inside the *mandis*. Therefore, any rational buyer/trader will move

raise the price at which a farmer can sell. But again, in a setting where there are millions of small farmers, would corporates see value in investing in private infrastructure, or would they employ the same middlemen to purchase on their behalf leaving the farmer with a raw deal? The experience in the state of Bihar, which abolished its own APMC markets in 2006, was that it neither brought private investments nor led to any substantial increase in farmer incomes.

The second major concern is that the government will scale down its public procurement. Many economists argue that the government of India over-purchases grains, primarily to support farmers, which ultimately rot in government go-downs. This is a waste of tax payers' money. These massive

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Date: 13/12/2020

Invitation for Tender (Works) (OTM)

e-Tender Notice N0-3/2020-2021.

e-Tender is invited in the National e-GP system portal (<http://www.eprocure.gov.bd>) for the procurement of following works, details are given below.

| SI No. | Package No | Name of work | Tender Last selling (date & time) | Tender Opening & Closing (date & time) | Tender ID no |
|--------|---|--|-----------------------------------|--|--------------|
| 1. | e-Tender/PEDP4/RAN/BIL/20202021/W2.00888 | Construction of Additional Class Room at West Mandirachara GPS Under PEDP4 | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 524071 |
| 2. | e-Tender/PEDP4/RAN/BIL/20202021/W2.00891 | Construction of Additional Class Room at Bottali Mom Under PEDP4 | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 524070 |
| 3. | e-Tender/PEDP4/RAN/BIL/20202021/W2.00890 | Construction of Additional Class Room at Tagolchara Mom Under PEDP4 | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 524069 |
| 4. | e-Tender/PEDP4/RAN/BIL/20202021/W1.01293 | Construction of Additional Class Room at Dichalchhari Mon GPS Under PEDP4 | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 524068 |
| 5. | e-Tender/PEDP4/RMT/BIL/2019-20/W1.00346 | Construction of additional class room BELAICHARI MON GPS under PEDP4. | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 524067 |
| 6. | e-Tender/PEDP4/RMT/BIL/2019-2020/W1.00342 | Construction of additional class room KENGRACHARI GPS under PEDP4 | 04-Jan-2021 16:00 | 05-Jan-2021 16:00 | 526534 |

This is an online tender, where only e-Tender will be accepted in the National e-GP portal and no offline/hard copies will be accepted.

To submit e-Tender, registration in the National e-GP system portal (<http://www.eprocure.gov.bd>) is required. The fees for downloading the e-Tender documents from the National e-GP system portal have to be deposited online through any registered Banks branches up to 05-Jan-2021 13:00 further information and guidelines are available in the National e-GP system portal and e-GP help desk (helpdesk@eprocure.gov.bd).

(Mutiuir Rahman)

13.12.2020

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